

JPRS-UEA-84-021

4 October 1984

# USSR Report

ECONOMIC AFFAIRS

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## INVESTMENT, PRICES, BUDGET AND FINANCE

### ECONOMIST DISCUSSES PRICE ROLE IN PLANNING

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 19-24

/Article by M. Kokorev, doctor of economic sciences, professor: "Price and Plan"

/Text At the February (1984) Plenum of the CPSU Central Committee K. U. Chernenko, general secretary of the CPSU Central Committee, noted the following: "The economic management system and our entire economic mechanism need a serious reorganization."<sup>1</sup>

The economic mechanism must be improved on the basis of development of an overall program, whose realization will help to solve a strategically important problem--to raise the efficiency of the entire national economy. Such a program should envisage the following: improvement in the organizational structure of management at all the levels and in all the links of the national economy and in its planning system on the basis of the requirements for an increase in the social and economic efficiency of public production; rise in the effectiveness of the totality of economic levers and incentives in the economic mechanism, including price formation, the credit and financial system, methods of evaluation of the results of economic activity and so forth.

The task lies not only in adjusting each element of the system of planned management of the national economy, but also in ensuring its purposeful interaction. Only by means of an overall and interconnected solution of problems concerning an improvement in the system of planned management is it possible to successfully accomplish the task of fully utilizing the advantages of the socialist method of production.

The selection of the most efficient directions in the development of the national economy and of the main links that make it possible to advance the country's economy along the intensive path is one of the urgent tasks in the improvement in planning and management.

Planning performs the main objective function in the system of management. The rates and proportions of expanded socialist reproduction, sources and end results are determined in plans. On the basis of the social and economic tasks of

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1. "Materialy vneocherednogo Plenuma Tsentral'nogo Komiteta KPSS 13 fevralya 1984 goda" /Materials of the Extraordinary Plenum of the CPSU Central Committee on 13 February 1984, Moscow, Politizdat, 1984, p 14.



the country's development during the planned period and the priorities stipulated by them plans determine the distribution of capital investments and the most important material resources throughout national economic sectors and the country's regions and the level of permissible expenditures of production resources on output and the development of the nonproductive sphere.

The plan's mobilizing role is also big. On its basis the daily practical work of all management links, associations and enterprises is organized and a strict control and production regularity are ensured. According to V. I. Lenin's definition, the plan is the accumulated will of workers and expresses their fundamental interests. Therefore, the nation-wide socialist competition, initiative and labor enthusiasm of the people are directed toward a successful fulfillment and overfulfillment of national economic plans.

The price plays an important role in the system of planned economic management. It has an effect on all the aspects of society's economic and social development, that is, on the rates and proportions in the development of public production, its efficiency, the people's standard of living, the stability of monetary circulation and the purchasing power of the ruble.

The planned price reflects socialist production relations and, at the same time, is the monetary expression of value.

The dual nature of the price determines the complex and at times contradictory nature of the interconnection of the price and the plan and its place in the system of planned management, in which planning plays the leading role.

The principles of the planned management of the national economy, goals and tasks determine the basis for the policy and functions of prices in the socialist economy.

The system of the planning and economic stimulation of production greatly affects the formation and development of the price model, especially the wholesale and purchase price.

State retail prices and the system of prices of consumer goods are formed in an inseparable connection with the program for social development and rise in the people's standard of living and are subordinate to its goals and tasks.

The indicators of the country's economic and social development established in state plans and the scientific-technical, resource saving and structural policy envisaged in them predetermine the prospects for changes in the level and structure of prices, improvement in their correlations and territorial differentiation. Therefore, the price policy, principles of planned price formation and the functions and system of prices are predetermined to a considerable extent by the tasks and conditions of and prospects for the country's economic and social development envisaged in state plans and by the system of planning and economic stimulation of production.

At the same time, the price is not a passive element in the system of planned economic management. It serves as a tool of formation of state plans and their realization. Prices are widely used for the determination of the most

important and generalizing quantitative and qualitative plan indicators, that is, the national product, national income, output of national economic sectors, capital investments, labor productivity, production cost, profit and so forth, which form the basis for state plans. However, the role of prices in the formation of plans lies not only in this.

F. Engels pointed out that in the future socialist society plans will be formed on the basis of a comparison of use values with the expenditures on their production. Such comparisons make it possible to select the possible optimum variants of planning solutions ensuring the attainment of maximum results with minimum expenditures of resources per unit of output and work. The substantiation of planning solutions and their correspondence to optimality criteria will largely depend on how accurately prices reflect the expenses of the production and sale of products and their consumer properties, quality and efficiency.

The selection of an optimum planning solution arises during the development of all sections of the state plan and its basic indicators. At the same time, using physical and value indicators, it is impossible to do without prices. The price is a tool of the planning and calculation of the expenditures of social labor and its results and its planning and calculation function performs the basic role in the system of planned price formation.

The price is of great importance in ensuring the fulfillment of plans and the organization of cost accounting, that is, a system of economic relations between society and its production links, as well as among the latter in connection with the production and distribution of the national product.

As is well known, cost accounting presupposes the commensuration of the expenditures and results of production, the responsibility of enterprises and associations for the fulfillment of planned assignments and their financial interest in the attainment of high end results on the basis of a sound and efficient utilization of production resources. The combined expenses of the production and sale of products and volumes of output are measured by means of prices, that is, one of the most important principles in cost accounting--commensuration of the expenditures and results of economic activity--is realized.

Since the price reflects the socially necessary expenditures of labor, it acts as the social criterion of evaluation of the individual expenditures of associations (enterprises) and the products produced by them. Therefore, the price reflects not only the expenditures and results of production in a comparable monetary form, but also includes the individual expenditures of enterprises in the socially necessary expenditures of labor and the products produced, in the social use value of goods.

The price serves as the basis for the system of economic stimulation of production, which is widely used in the provision of incentives for scientific and technical progress, improvement in the assortment and quality of output, an efficient utilization of production resources, refinement in the organization of public production and solution of social problems.

However, the price is not only the tool of formation and realization of plans. The planning system as the main method of ensuring planned economic development is built on the application of economic levers and incentives, in whose system an important role is assigned to the price.

Planning is based on a scientific forecast of the processes of the country's economic and social development, the possibilities of an efficient effect on these processes and their planned control. It presupposes primarily a forecast of public needs, whose possibilities are limited and are narrowed as the planned period is prolonged. In particular, this is characteristic of the end product, especially of the part of it that is represented by the consumption fund. The point is that the bulk of public needs for consumer goods assumes the form of effective demand. However, effective demand contains irrational elements and its structure is dynamic and is formed in accordance with individual criteria of consumption optimization. For example, it is impossible to prescribe the structure of consumption for the population, because every consumer has the right to a free choice of goods. Nevertheless, effective demand can be controlled primarily by means of production, as well as through the use of the price system and advertisement. Since the possibilities of planning the structure of effective demand are limited, elements of uncertainty inevitably arise in the planning of the intermediary product, because the volume and composition of the latter are formed under the effect of the end product.

In state plans the development of public production is determined on the basis of the interests of society at large. For the planned organization of work of individual associations (enterprises) the specific collective interests and the interests of their workers are of great importance.

An economically substantiated price system interests the direct executors of planned assignments in an efficient utilization of the resources allocated to them, serves as a reliable guideline when they select solutions and makes it possible to indirectly control processes not lending themselves to a direct planned effect. It plays an important role in the formation of proportions, especially at a regional level.

The system of planned national economic management in the USSR was formed under complex historical conditions. Historical tasks of an accelerated development of the socialist industry, technical reconstruction of the national economy and strengthening of the country's defense capacity under conditions of limited resources were solved during the period of the first five-year plans. The high level of socialization of means of production and of the national wealth created favorable conditions for a successful solution of these problems on the basis of a centralized redistribution of resources. The availability of vast labor resources in combination with rich natural resources ensured the possibility of a rapid development of public production through an extensive utilization of intensive and extensive factors. The indicated conditions determined the characteristic features of the system of planned management of the national economy in the USSR, which to a certain extent remained to this day.



The plan as the dominating element in the entire system of management with maximum centralization of management made it possible to successfully solve the problem of accumulation of limited resources and of their distribution and utilization at the decisive directions in economic and social-cultural construction.

The rigid regulation of all the aspects of activity of various national economic links from above and, especially, of the primary link--enterprises--limited their rights and initiative.

The weak utilization in management of economic levers and incentives, including prices and their stimulating function, was due mainly to the limitation of the resources that could be utilized for purposes of economic stimulation. For example, 5 percent of the profit was deducted into the economic incentive funds of state enterprises and economic organizations in 1960. This totaled 1.3 billion rubles, or about 16 rubles annually (1 ruble 34 kopecks per month respectively) per worker and employee engaged in the national economy. In 1981 these deductions reached 20.3 billion rubles, or 17 percent of the profit, that is, in 21 years they increased more than 15-fold, totaling 189 rubles per worker and employee annually, or about 16 rubles per month.

The further development of the system of planned management of the national economy was accompanied by the regulation of centralized planning, extension of the rights and initiative of associations (enterprises), as well as of the powers of local management bodies, and a more active utilization of economic levers and incentives, primarily prices. All this strengthened the role of the price in the system of management and its connection with the plan.

The June (1983) Plenum of the CPSU Central Committee noted the need for a fundamental improvement in planning and management, as well as in the development and introduction of the principles of a scientifically substantiated price formation in practice. This is dictated primarily by the tasks of intensification of public production and by the need for an overall solution of large-scale problems. The intensification of production signifies its growth as a result of a qualitative improvement in production resources and their more efficient utilization. It presupposes an expansion of the production of enterprises where these resources are utilized more efficiently and its limitation at enterprises with a high level of production expenses.

The policy of production intensification is incompatible with a lengthy application of individual wholesale prices and the practice of compensation for the losses of some enterprises with the income of others. It is advisable to reduce the differentiation of wholesale prices in the processing sectors of industry, providing incentives for well operating enterprises, because they are able to ensure an increase in output at a relatively low level of expenditures.

The principle of compensation for the permissible level of expenditures and provision of an economically substantiated net income should become dominating during the formation of prices of output of an interrepublic and interregional exchange. The role of the price in the redistribution of income among the country's republics and regions must be limited gradually.

Of great importance is the problem of an optimum combination of the stability of wholesale prices with their mobility, which is one of the conditions of the stability of plans and of the system of economic stimulation of production. The preservation during the five-year plan of stable wholesale prices in industry, estimated prices in capital construction and rates of freight transport is one of the prerequisites for the stability of five-year plans and for their transformation into the basic form of planning. In accordance with the decisions of the 25th and 26th CPSU congresses the policy of stability of retail prices of basic foodstuffs and nonfoodstuffs meets the fundamental interests of the broad strata of the population.

At the same time, it is necessary to thoroughly weigh the social and economic consequences of the stability of prices and the possibility of limiting it to a temporary framework and to certain types of products, utilizing various forms of price flexibility if they are dictated by the conditions of the production and sale of products. It is also necessary to study the possibility of delimiting stable and dynamic plan parameters, because not all indicators possess features ensuring their stability for a 5-year period.

At the same time, it is necessary to remember that planned centralized indicators are utilized for the control of appropriate processes, that is, economic, scientific-technical, social and so forth, and the intensity of these processes and their direction can be changed in time. Therefore, from these positions it is difficult to substantiate, for example, the need for the application of a uniform temporary framework during the determination of the stability of capital investment plans.

The economic experiment conducted in a number of industrial sectors, as well as the new forms and methods of management in the service sphere, create the prerequisites for a more efficient combination of the stability of the system of planning and economic stimulation of the economic activity of associations (enterprises).

In accordance with the decree of the CPSU Central Committee and the USSR Council of Ministers "On Additional Measures To Extend the Rights of Production Associations (Enterprises) of Industry in Planning and Economic Activity and To Strengthen Their Responsibility for the Results of Work" provision is made in the five-year plan for the approval of a limited number of indicators differentiated with due regard for the characteristics of the work of appropriate industrial sectors for production associations (enterprises). In case of a change in objective conditions the assignments of the five-year plan of production associations (enterprises) in annual plans can be refined without a change in the established economic standards.

The extension of the rights and initiative of production associations (enterprises) in planning and economic activity require the further improvement in the organization and increase in the efficiency of planned price formation. It is possible that the solution of this problem will require certain changes in the examination and approval of prices, in particular a simplification of this procedure with regard to new goods. Advanced standard-parametric methods of price formation, modern computer equipment and the introduction of price



lists and scales of fixed temporary rises in constant prices of new products can play an important role in this. Of course, such changes in price formation cannot weaken the basis for a unified state price policy. It should be conducted under the constant supervision of the USSR State Committee on Prices and republic price formation bodies. At the same time, it is necessary to strengthen the role of price standards established in a centralized manner and guaranteeing the combination of the interests of industry, the financial system and consumers of products.

The acceleration of scientific and technical progress and rise in the technical level and quality of output are some of the most important tasks in the improvement in the economic mechanism. The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures To Accelerate Scientific and Technical Progress in the National Economy" envisages a system of measures to improve the organization, planning and economic stimulation of scientific and technical progress. It has been established that the fulfillment of plans and assignments for the development of science and technology and for a rise in the technical level (quality) of output is included among the most important indicators, according to which, first of all, the results of economic activity of associations (enterprises) will be evaluated and the socialist competition will be summed up. The interest of production associations (enterprises) and their workers in an accelerated introduction of scientific and technical achievements and their economic responsibility for results have increased significantly.

At the same time, the role of prices in the system of stimulation of scientific and technical progress has risen. The USSR State Committee on Prices is given the right to establish rises at the rate of up to 30 percent in wholesale prices of highly efficient, new products and reductions at the rate of up to 30 percent in wholesale prices of industrial products subject to removal from production. The substantiation of the amount of temporary rises presupposes the regulation of the method of determining the efficiency of utilization of new equipment with due regard for all factors determining the effect, including social factors.

A change in production expenses and prices is an important factor in the stimulation of scientific and technical progress and improvement in the production structure. When prices of means of production rise, their consumers face the need for the introduction of technical innovations and regulation of production organization for the sake of lowering production expenses and improving the consumer properties and quality of output.

The reforms in wholesale prices conducted in the USSR were based on the principle of compensation for the rise in expenditures caused by the increase in prices among suppliers. This made it possible to ensure the planned level of profitability for all sectors, but, at the same time, weakened their interest in lowering the production cost and improving the consumer properties and quality of products. As a rule, they were not concerned with the scale of the forthcoming rises in wholesale prices of means of production, because they knew well that the increase in production expenditures would be compensated by a rise in the prices of their output and be reflected in the plan. It seems that the principle of compensation for the additional expenditures caused by a rise in wholesale prices needs to be corrected further.

Under present conditions an improvement in planning presupposes an intensification in the role of long-term plans. However, they cannot be developed on the basis of current prices reflecting the expenses of the production and sale of output during the period of plan development. Such plans should be based on long-term prices taking into consideration the dynamics of expenditures and the efficiency of output. Problems concerning an improvement in planning and price formation should be solved in an overall manner in unity with other elements of the economic mechanism.

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CSO: 1820/165

## ECONOMIC MODELING AND COMPUTER TECHNOLOGY APPLICATION

### MODELING DEVELOPMENT, LOCATION OF INDUSTRY

Moscow EKONOMIKA I MATEMATICHESKIYE METODY in Russian No 2, Mar-Apr 84 (manuscript received 4 Jul 83) pp 285-294

[Article by O. B. Braginskiy, D. M. Kazakevich and Ye. P. Shchukin: "Optimizing the Development and Location of Production Within the Branches of the National Economy, and Evaluation of the Efficiency of Economic Measures"]

[Text] The modeling and methods of optimizing the development and location of production in the branches of the national economy are one of the best elaborated and fairly widely applied chapters of the theory of optimal national economic planning.

Theoretical research and practical application of the methods of optimizing the development and location of production began with the work done at the TsEMI [Central Institute of Mathematical Economics], IEiOPP [Economics and Organization of Production Institute], SOPS [Council for the Study of Productive Resources] attached to USSR Gosplan, subsequently GVTs [Main Computer Center] of USSR Gosplan, and at a number of ministries, central agencies and branch institutes. In the period 1961-1975 alone, they participated in the solution of about 200 industry optimization problems.

Practice shows that the computations for optimizing the development and location of industry permit cost reductions of 8 to 12 percent on average. This includes savings of 10 to 15 percent on investment costs, and 6 to 10 percent on operating and transportation costs [1]. These savings stem primarily from using the methods of mathematical economics and electronic computers that are able to take into account and process a huge volume of information.

Since the elaboration and practical realization of the first optimization models, the problems of developing and locating production in industries have been formulated, and recommendations have been made regarding the optimality criteria for industry problems and the principles for selecting the most important factors that significantly influence the results long-term. A classification of industry problems has been proposed; standard mathematical-economic models have been constructed in agreement with this classification; and schematic diagrams have been prepared for formalizing the conditions to be introduced in linear and integer programming. Methodological rules have been elaborated for calculating the necessary initial data, and the methods have

been systematized of solving the basic types of industry problems with the help of electronic computers.

The work on industry planning has been generalized in methods for optimizing the long-term development and location of production [2, 3].

Since the planning of the development and location of industries--according to the classification adopted in the plan of comprehensive methods for evaluating the efficiency of economic measures [4]--applies to large-scale measures, the evolved system of industry computations has to be coordinated with the general principles for determining costs and benefits, the indicators of efficiency in the mentioned plan. This article is an attempt at such coordination, within the basic requirements of the methodology [4].

Formulation and solution of the problems of developing and locating production enable us to comprehensively determine the location, size and specialization of plants; to choose the technology from among its possible alternatives; to evaluate the economic expediency of continuing to operate existing enterprises, reconstructing them or (in individual instances) shutting them down; to find the efficient alternatives of building new plants; to determine the investment and other productive resources required, allocating them among the plants by years of the plan period; to plan the most efficient transportation (the routes and volumes of raw materials, intermediates and finished products); and to estimate the producers' economic rent, and the costs of the allocated types of fuel and energy.

Optimization computations thus provide answers for a very wide range of problems that cover the determination of practically all indicators of an industry's state and dynamics.

These computations are performed in the following stages: formulation of the objectives, tasks and possible ways of an industry's long-term development; localization of the system, i.e., identification of the set of plants belonging to the system, and of the relations between the industry or group of industries and the national economy; specification of the planning horizon's length; selection of the optimality criteria and their corresponding objective functions; formulation of the conditions to be taken into consideration in conjunction with the development and location of a group of industries, an industry or individual plants, and elimination of the factors that do not affect significantly the anticipated result; mathematical statement of the problem, i.e., presenting it as a developed mathematical-economic model; preparation of the initial information, including a description of the possible alternatives for the development of individual plants or their sets, data on the demand for the product, and the limits on material and labor resources, current and capital costs, and other indicators; selection or elaboration of a computation method and program for the solution of the problem, taking into consideration the characteristics of the electronic computer to be used; solution of the problem for all of the changing conditions' alternatives that are necessary for analysis; analysis of the results of the computations; and the issuance of recommendations for the adoption of planning decisions.



So many stages complicate the performance of this work because it is necessary to constantly coordinate each successive stage not only with the preceding one, but with noncontiguous stages as well: with the formulation of objectives and with finding and developing the necessary information, for example. Here the set objectives determine the composition of the information used, but the limited availability of statistical data can force a reduction of the number of expected results and narrow the scope of the undertaken search.

In practice, all the listed stages of the optimization computations have to be completed only when the appropriate group of industry problems is first formulated. Thereafter it is possible to use the formal elements prepared earlier, a significant part of the information and programming, and the proven analytical methods. When an industry systematically uses optimization computations, a volume of material accumulates that reduces to half or a third the man-hours needed to set up and implement new directions of planning activity. In the course of all this, however, the wide range of the national economic results' variation--as a function of how the problems are formulated, how complete is the analysis of the results, and what kind of information is used--demands an extremely strict approach to performing each of the stages, giving preference to the social-policy objectives over the industry's khozraschet objectives, striving for the adequate formalized representation of the essence of the economic processes, etc.

When formulating the objectives and tasks of production's long-range development and location, it is necessary to use as guidelines the documents containing the programs and directives of the party and government, to provide for the solution of the socioeconomic tasks, and to take into consideration the forecasts of the progress in science and technology that are used to set the industry's technological policy, the possible harnessing of new natural resources, and the progressive trends in the dynamics of the economy's sectoral and territorial structure.

Localization of the industrial system on the basis of a preliminary analysis reveals the circle of industrial plants, users, and transportation relations that must be included in the problem. Defining the limits of the system's optimization, this circle of plants and relations must be such that the factors not taken into consideration will not be able to alter significantly the conclusions obtained from the computations.

Choice of the planning horizon's length depends on the specifics of the industry and the peculiarities of the problems to be solved. A 10- to 15-year planning horizon is chosen in most cases. A 10-year horizon is expedient for computations covering a five-year period; and a 15-year horizon, for substantiating the basic directions of the industry's development and location, so as to take the consequences of the planned solutions into consideration.

Two formulations of the problems of an industry's development and location are distinguished: the static and the dynamic. In the static problem of an industry's long-range planning, the indicators characterizing the state of the industry and its plants usually are determined for the last year of the planning period. In the dynamic problem, the operating and developmental conditions of the system to be optimized, and of its component plants, are given for each



year or a number of years within the planning horizon and are considered within the framework of a single problem. Here it is especially important to reconcile the sequence of each plant's states over time. The individual alternatives' indicators of efficiency are computed as overall indicators for the entire planning horizon.

The dynamic problem gives a more meaningful solution in that the fate of each investigated plant is followed from year to year throughout the entire planning horizon, and for each year a solution is obtained that is balanced for all the plants. The static problem does not give a trajectory describing the development of the enterprises or entire industry; it merely finds their state at one specific point in time. To partially compensate for this shortcoming, we can solve several static problems for the intervening years of the planning horizon: for the 3d, 5th, 8th and 10th years within a decade, for example.

Usually the following basic types of efficiency criteria are used in computing the alternatives of production's development and location: the calculated total cost of production, and of transporting the raw material and the semifinished and finished products; the national economic benefit from production and its use, or the total profit on the output's production and sale; and the output volume of products or sets of products.

Accordingly, the objective functions in optimization problems assume the following three forms: minimize the calculated total cost of producing, transporting and using the raw material, intermediate and finished product, under the condition that the given demand for the product is supplied in the specified assortment (taking product substitution into consideration); maximize the national economic benefit in the form of savings in the production and use of an industry's output, with due consideration for the constraints, or (in individual instances) maximize the profit under the same conditions; and maximize an industry's highly efficient output that is in short supply, when the resources for it are scarce.

The first of these forms is the most widespread in practice. The second form is used when the production volume or product mix are not given in advance, but must be determined by solving the problem (in this case the sphere of optimization is broader, because the mutual substitution of products is possible). And the third form is used when the resources that the industry can be allotted during the planning period are limited, and the industry's output is obviously efficient and in short supply.

Once the efficiency criterion and the objective function have been chosen, information is developed about the industry's existing plants, its plants scheduled for reconstruction, plants under construction, and proposed future plants. For the plants that are included in the computations, their technologically feasible modes of operation (production modes) are described. Here each mode is characterized by its input norms and output volumes, whereby its contribution to the value of the chosen objective function's indicator is determined.

By varying the given modes of production, it is possible to include in the model alternative permissible conditions for the operation and development of

the industry's plants during the planning period. For example, outputs intended for the same use but produced with different technologies reflect the economic advantage of this or that direction of progress in science and technology realized in the industry. Varying the modes of production enables us to take into consideration in the solution the following factors: specialization; the regional differences in production costs; the directions and time limits in the reconstruction and expansion of existing plants; the construction time of new plants; and the use of more readily available resources to produce the output.

The evolved planning and design practice basically tends to formulate the problems of long-term production planning discretely. Here, on the basis of a preliminary technical and economic analysis, some finite number of alternatives are chosen for the development and specialization of each of the plants, and technical and economic indicators are set only for these plants. Any of the alternatives is either included completely in the plan or is excluded entirely from it. The discretely formulated problem usually employs alternatives, elaborated in advance, for the construction of new plants, with feasible variations of the technology, sets of equipment, capacities, specialization, location, etc.; and also the feasible modes of reconstructing the existing plants, taking into consideration the changes in the schedule and scale of reconstruction. This approach makes it possible to reflect the conditions of the plants' technological integrity that are due to various causes: for example, the production equipment is indivisible (blast furnaces and steelmaking furnaces, rolling mills, kilns in the cement industry, technological lines of the housing construction combines, automatic lines, installations for petroleum refining, etc.); there is a changeover to standard capacities with specified sets of equipment, etc.

Another possible approach is the so-called continuous formulation of the problem. Here the alternatives of the plants' development constitute a continuous set and are formed in the process of solving the problem, on the basis of predetermined laws for the changing of the plants' technical and economic indicators in accordance with the production volume and product mix.

A "mixed" formulation of the problem is likewise possible. Here the alternatives of capacity construction are regarded as discrete, and the modes of their utilization constitute a continuous set.

The set of constraints included in the problems of optimizing the development and location of production is determined by the specifics of the investigated industries, and by the formulation of the problem. The constraints may reflect the following: (a) the maximum limits within which the system to be optimized is able to use the different kinds of resources--the production capacities, capital investments (provided the capital costs are not included in the economic indicators of cost that enter into the optimization problem's objective function), manpower resources and skilled labor in particular, raw and processed materials, sources of energy, certain types of equipment, etc.; (b) the demand for the output that must be supplied unconditionally, and the conditions of the output's substitution; (c) the relationships between consecutive states of the same plant (when the problem is formulated as a dynamic one); (d) the relationship between the industry's plants and the

transportation conditions; and (e) the requirements regarding the size and structure of the production capacities and specified plants, at the end of the planning horizon.

The content of the problem, and that of the mathematical-economic model chosen for the problem determine the composition of the initial information.

When the problem calls for minimizing costs, the following basic data are necessary: the anticipated demand for the industry's output (in its consolidated product mix) by economic regions, and the level of supplying this demand; the modes of the existing enterprises' operation, and the alternatives of reconstruction and production expansion; the sites for the location of the proposed new plants and their modes of operation; the costs of transporting the finished product to the rayons or localities of its consumption; and the current and capital costs of production.

When the problem is to maximize the benefit, the list includes the following data: the lower (mandatory) level of supply, and the economically warranted demand for the industry's output; similarly as for the preceding formulation, data on the existing enterprises' modes of operation and costs, the alternatives of reconstruction and production expansion, and also of new construction, with the corresponding technical and economic indicators; the limits on resources (capital investment, raw materials, etc.); and the economic benefit from output substitution.

The lower, mandatory level of supply includes first of all the indents of the users who have absolute priority, for social considerations (the medical industry, social insurance, etc.). Next, the indents of the users unable to substitute anything else for the output of the industry that is being optimized, and failure to supply them would result in the shutdown of the industries in question. We should include in this group also the users who have been using the given output continuously over a period of years.

The economically warranted demand includes all instances of an output's use, by any user, when it is more economical than to use substitute products or materials. In some formulations of the problem to maximize the economic benefit, the specific magnitude of this demand cannot be determined in advance (when optimizing a complex of interrelated industries, for example) because the production costs will change in the course of solving the problem. The costs might improve when raw material of high quality or advanced technology is supplied. When constraints on the most valuable resources come into play, the economic benefit might be less than what the preliminary estimates showed. As a result, in the economically warranted demand it is necessary to include also those alternatives of the output's use for which the preliminary computations gave a specific benefit close to zero or slightly negative. Here the volume of information increases due to the less efficient types of output and less efficient users.

In the static problem, all the above indicators are found for the final year of each five-year plan within the planning horizon; and in the dynamic problem, for the individual years that are specified in the statement of the problem.



To determine the demand for the outputs of industries, input-output computations may be used, with due consideration for the following: the anticipated volumes of the individual users' activity and scientifically substantiated, progressive standards for using the output of the system that is being optimized; the data on foreign trade; the planned standards of personal consumption; forecasts of the demand based on analyses of the actual data and the trends of their change; and the input-output planning computations.

To reduce the probability of including unsubstantiated data in the initial information or of omitting some of the efficient alternatives when elaborating the indicators characterizing the modes of production, it is expedient to consider those competing alternatives of the enterprises' specialization and location that are elaborated by various planning organizations but are reduced to make them mutually comparable, and also the proposals of the territorial administrative organs and enterprises. All these alternatives should first be submitted to thorough departmental expert evaluation.

When formulating problems to minimize cost, the information includes current costs (or the production cost) and capital investment. Only new investments essential to ensure the assigned output volume are taken into consideration. In conjunction with this, the future capital costs are calculated of finishing the fixed assets that are under construction, and also of reconstructing, modernizing, expanding and maintaining the fixed assets already in operation. Past capital investments, embodied in the plants already existing or under construction, are expressed not in monetary form, but as built capacities and construction starts. Investments in circulating capital are taken into consideration at the enterprises that are operating or about to be commissioned.

Current costs can be determined in two ways: by the methods of production costing that are customary in the industries concerned, or with the help of mathematical-economic models of the operation of the plants belonging to the system that is to be optimized.

When computing current costs, one must bear depreciation in mind and not allow the double counting of the same costs as capital investments and also as current costs. In this context, the cost of a major overhaul is either an item of current costs, or a direct expenditure on repairs under capital investment.

The depreciation for renovation is included in current costs when the calculated annual costs are used as indicators of the objective function, and it is determined on the basis of standards computed with due consideration for the factor of time. In the case of operating enterprises whose closure during the planning period is probable, the depreciation for renovation is not included in the current costs.

To avoid double counting when taking the current production outlays into consideration where the initial raw materials undergo many stages of processing, the current costs are calculated as the sum of the initial raw material's cost and of the processing costs in each stage. The costs associated with the use of natural resources (land, commercial minerals, water, etc.) are taken into account as estimates of economic rent. The expenditures on fuel and energy are determined on the basis of the estimates obtained in optimizing the

development and location of the country's fuel and energy complex. As approximate values of these estimates, it is possible to use the indicators of the costs of the allocated types of fuel and energy. The transportation costs should be calculated with the help of the estimates contained in the optimized plan of the transportation network's long-range development. As approximate values of these estimates we may use the indicators of the annual average specific calculated costs of freight transportation.

In the composition of capital investments we include the following, regardless of their sources and forms of financing: the impending costs of productive fixed assets about to be commissioned (including projects under construction); the future capital investments associated with the expansion, reconstruction, reequipment and maintenance of the existing enterprises' capacities; the costs of providing and increasing productive circulating capital; the future costs of the geological exploration and development of commercial mineral reserves, and the R & D costs related to the investigated system's plants; the costs of restoring and protecting the environment; the future costs associated with ensuring manpower for production; the costs of installations intended for the entire economy, and of the nonproductive fixed capital related to the given plant, including a share of the multipurpose plants; and the costs of reimbursing the losses caused by construction.

Capital investments in the industrial and social infrastructure are determined in accordance with the ratios of shared participation.

When determining the capital investments, we include the costs of reimbursing the losses arising from building new plants or closing down existing ones.

In the case of a static problem, to find the objective function's coefficients we use the indicators of calculated annual costs, computed according to the formula:

$$Z_j^r = C_j^r + E_n K_j^r \quad (1)$$

where  $Z_j^r$  - calculated costs;  
 $C_j^r$  - full current costs;  
 $K_j^r$  - capital investments according to the r-th alternative of the j-th plant's development; and  
 $E_n$  - standard efficiency of capital investments.

We obtain the objective function's coefficients in a dynamic problem by using the indicators of integral costs that are determined according to the formula:

$$Z'_{int} = \sum_{t=1}^T \bar{Z}_j^r A_j^{rt} \alpha^t, \quad (2)$$

where  $A_j^{rt}$  - output volume by the r-th mode of production at the j-th plant in year t;  
 $\bar{Z}_j^r$  - weighted average calculated cost per unit of output by the r-th mode of production at the j-th plant;  
 $Z'_{int.j}$  - integral costs by the r-th mode of production at the j-th plant;  
 $\alpha^t$  - discount coefficient.



The weighted average calculated cost per unit of output for the considered period is:

$$\bar{Z}_j^r = \frac{\sum_{t=1}^{T_{pj}^r} (K_j^{rt} + C_j^{rt}) \alpha^t}{\sum_{t=1}^{T_{pj}^r} A_j^{rt} \alpha^t}, \quad (3)$$

where  $t$  - index of the current year within the considered period;  
 $T_{pj}^r$  - duration of the considered period for the  $r$ -th mode of production at the  $j$ -th plant;  
 $K_j^{rt}$  - capital costs for the  $r$ -th mode of production at the  $j$ -th plant in year  $t$ ; and  
 $C_j^{rt}$  - current costs for the  $r$ -th mode of production at the  $j$ -th plant in year  $t$ .

It is expedient to determine the integral costs according to formula (3) when the plants' economic indicators and volumes of activity change considerably in the individual years. The use of weighted average quantities in computing the cost indicators makes it possible to calculate the benefit from the production plants' operation not only during but also beyond the planning period. This is especially important when evaluating the efficiency of plants that require capital investments during the planning period and will be placed in operation only at the end of that period.

If the horizon of the computations--including the years of the plant's construction and operation--must be shortened because the long-range information is indeterminate, then its length for the plants (alternatives) to be compared is chosen so that the effect of the time during which the investment costs are incurred for each plant (or alternative) upon the output volume and level of current costs will be equalized as much as possible.

The specifics of optimizing the development and location of individual industries, industrial complexes, etc. require the construction of corresponding mathematical-economic models, which is the subject of special, particular methods of optimization. In the following, therefore, we will briefly present, mainly as examples, some of the standard models that have found widespread application: the model of the multiproduct production and transportation problem; and static and dynamic models for optimizing the production structure and the output's use.

In a model of the production and transportation type, the values are determined of the intensities of employing the possible modes of production (employed or not employed), and of the volumes of freight transported from each producer to each user, at which the total current and capital costs of production and transportation will be minimized. Here the following conditions are met: the established demand of each user is fully supplied through the joint efforts of all producers; the limits on the use of scarce resources are observed; the physical balances of production and transportation are observed; and the mode of production at each location is discrete.

In the static problem, the calculated costs are minimized, and all constraints apply to the horizon's last year. In the dynamic problem, the discounted integral costs are minimized, and the constraints apply to each year.

When it is obvious that transportation is not a significant factor, the model of the dynamic production problem is used. It calls for determining the set of production mode intensities at each of the considered plants (the modes of production employed or not employed) that will minimize the integral costs reduced to a same point in time. Then the following conditions are met: the demand for the output is supplied each year within the planning horizon, the constraints on resources are observed, and the production plants are discrete.

When the demand is not specified and only a lower (mandatory) and an upper level of supply are set (the latter includes all economically efficient directions of use), it is recommended to optimize the production structure and the output's use (its allocation among the users). The problem calls for maximizing the total benefit for the entire planning horizon (the benefits are reduced to the same year by means of the discount coefficient), from the production and use of all the types of products considered in the model, when the volumes of resources are fixed (limits on capital investments, raw materials, etc.).

Here the following conditions are met: the lower level of production is determined by the already attained output volumes of each type of product, and by expanding (or curtailing) their consumption at the users who were using these types of products before the planning horizon's start; during the year, the increase in the consumption of a product in every direction of its application cannot be more than the difference between the upper and the lower limit of the given direction's demand for the type of product in question; if products lend themselves to mutual substitution in any direction of their use, maximum coefficients of mutual substitution (from 0 to 1) are introduced that reflect the effective limits of substitution and the conditions for the preliminary aggregation of the types of products that are similar in their conditions of application and their indicators of economic benefit, because both the products that do and the ones that do not lend themselves to substitution could fall in the same aggregate; during any single year, no more of each type of product may be consumed than what is produced that year; in the case of products whose output should obviously be curtailed, the output volumes may be maintained at most at the preceding year's level; and the total expenditure of scarce natural resources and of allotments for capital investment may not exceed the limit set for the given year.

The final results of the computations based on mathematical-economic models provide a large volume of material for analysis. The main purpose of analysis is to determine the economic efficiency of the alternatives of the development of the entire system that is being optimized and of its individual plants as well, and how the conditions stated in the formulation of the problem influence this efficiency. In the process of analysis it is necessary to check whether the formulation of the problem agrees with the realistic conditions of the system's development, and whether the initial information is complete and accurate (it is corrected and supplemented if necessary). The process of arriving at the optimal solution is investigated, and the extent to which the individual

conditions influence the optimal solution is determined, in the search for ways to further improve the plan's efficiency. The stability of the obtained solution is investigated, from the viewpoint of changes in the type or structure of the problem's initially adopted conditions (exclusion of existing constraints or inclusion of additional ones, change in the set of plants and in their description and modes of operation, and variation of the methods of evaluating transportation and the criteria of efficiency), and also of fluctuations in the values of the initial indicators (while the structure of the constraints, set of plants, the modes of their operation, and the efficiency criteria remain unchanged).

In addition to the traditional economic and statistical methods, also special mathematical-economic methods are used. The latter include particularly the computation and comparison of the plan's alternatives, parametric analysis of the solution, and mathematical-economic evaluation (dual variables).

Alternatives are computed first with the composition of the plants, modes of production and the problem's constraints kept unchanged, and using the same efficiency criterion. In this case the values are varied of such initial data as the technical and economic indicators of the plants, the production plan's structure, etc. Next, computations are run for different levels of demand, and changes in the constraints on available resources and in the value of the coefficient of efficiency, using different optimization criteria. After a series of computations, the plan's indisputable components are identified (the plants and the alternatives that occur in most of the solutions), and so are the components that have to be further amended.

By varying the initial indicators, it is possible to determine the influence of possible errors in the information. If a change in the value of some indicator does not produce significant variations of the solutions, then the requirements regarding the accuracy of computing such a parameter may be reduced, and conversely. Here special attention must be devoted to those indicators whose confidence level is inadequate. In this case, additional information must be introduced to obtain the final solution.

Changes in a problem's set of plants, modes of production, constraints and type of efficiency criterion enable us in particular to verify what effect additional conditions, not included in the initial computations, will have on arriving at the solution. When the set of plants and the modes of their operation are varied, the influence can be evaluated that the degree of the production plants' aggregation, their scattered locations, the concentration and specialization of production, the directions of technological progress, the methods of estimating transportation costs, etc. have on the problem's solution.

So far as the plants that do not occur in every alternative are concerned, they must be subjected to additional analysis, taking into consideration more detailed technical and economic background information and also the factors that are not reflected directly in the optimization computations.

Mathematical-economic analysis with the help of estimates enables us to determine the relative efficiency of the system's plants and of their modes of operation (included or not included in the considered alternative). Estimates are



used in the analysis basically to determine the comparative efficiency of the conditions and factors defined in the formulation of the problem, their effect on the extreme values of the objective function, and the problem's conditions whose change can yield a more efficient alternative of the plan for the development and location of production in the given industry; and also to identify the plants not included in the optimal plan and to rank them on the basis of their economic efficiency. Without solving the problem anew, it is possible to determine with the help of estimates (within the limits of their stability) the effect of changes in the plan upon the objective function's experimental value.

A simple optimization computation usually does not suffice for a sound economic analysis because it is performed with a minimal number of constraints included in the problem. Therefore the computations for optimizing the development and location of production are usually iterative, changing each time the values of the constraints and their set, and the content of the efficiency criterion. The obtained data serve as the basis for the elaboration of recommendations for economic measures of top priority. The computation results that characterize further stages of development within the planning horizon are regarded as preliminary. On the basis of correcting the initial information and of the attained development indicators, they eventually are made more precise as the time comes for macroeconomic management to adopt new measures.

On the whole, optimization of the development of industries and industrial complexes is based on the general principles of evaluating the efficiency of economic measures, applicable to every level of the economy's management. Therefore the formation of economic standards, prices and indicators of efficiency, and the estimation of resources must be based on uniform methodological principles. Industry-level peculiarities are associated mainly with the composition of the plants to be optimized, the content of the initial information, the criteria, and the methods of analyzing the results. Accordingly, methodological instructions should be elaborated for the individual industries.

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CSO: 1820/138

## REGIONAL DEVELOPMENT

### REGIONAL ASPECT OF INTENSIFICATION EXAMINED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 69-79

/Article by M. Gokhberg, head of a sector of the Central Scientific Research Economic Institute under the RSFSR Gosplan, doctor of economic sciences: "Regional Aspect of Intensification of Public Production (Using the Central Economic Region as an Example)"

/Text At the February (1984) Plenum of the CPSU Central Committee Comrade K. U. Chernenko, general secretary of the CPSU Central Committee, stressed the following: "Intensification, an accelerated introduction of the achievements of science and technology into production and the implementation of major over-all programs--ultimately, all this should raise the productive forces of our society to a qualitatively new level."<sup>1</sup>

Under the conditions of intensification of public production such aspects of the reproductive process as the reconstruction, retooling and modernization of enterprises with a stabilization and reduction in industrial and production personnel on the basis of a constant labor productivity growth acquire an ever greater role. Such basic directions in scientific and technical progress as overall mechanization, automation, chemicalization, electrification and biologization of production, development on their basis of highly efficient advanced technology and equipment, intensification of specialization, combination and cooperation, transition to automated production management systems and implementation of a resource saving policy aimed at an efficient utilization of natural and labor resources become the most important factors in the intensification of public production.

Highly developed regions in the country's European part, which are noted for the availability of a powerful production and scientific potential and skilled personnel, have the most significant resources for the intensification of public production. At the same time, they are characterized by a complexity of social, economic, demographic, ecological and territorial conditions, the interweaving of the new and the old, inertness in existing interconnections and processes and the existence of disproportions in the structure of the economy

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1. "Materialy vneocherednogo Plenuma Tsentral'nogo Komiteta KPSS 13 fevralya 1984 goda" /Materials of the Extraordinary Plenum of the CPSU Central Committee on 13 February 1984/, Moscow, Politizdat, 1984, p 14.



and its territorial organization. The Central Economic Region is the biggest and most developed region in the country. Using it as an example, it is advisable to illuminate the paths of intensification of public production, taking into consideration that, basically, they are also characteristic of other very developed economic regions in the country.

The high degree of opening of territories and the existence of a developed national economic potential and of a production, social and engineering infrastructure determine for the Central Economic Region less lengthy periods of industrial (by 15 to 20 percent) and residential housing (by a factor of 1.5 to 2) construction and a lower estimated cost of industrial projects (by 15 to 20 percent) and residential housing construction projects (by 20 to 34 percent) than in the eastern regions of the RSFSR. The total capital expenditures on the establishment of social infrastructure projects in the region are estimated at approximately 5,000 to 6,000 rubles per person, whereas in the regions of Siberia and the Far East they reach 10,000 to 30,000. The efficiency of material production in the Central Economic Region (labor productivity) is 10 to 16 percent higher than, on the average, in the country. All this is due to the availability of modern productive fixed capital, development of science and scientific services, a system of training skilled working personnel and a well-developed transport network. This intensifies the attempt on the part of sectorial ministries to place in this region new enterprises and to develop existing production facilities of enterprises in machine building, chemical and petrochemical industries and other sectors, which do not always correspond to the tasks of improvement in the directions of all-Union specialization. The capacities of electricity, fuel and materials intensive production facilities selling their output far beyond the region's boundaries have often been built up despite the growing intensity of labor, fuel-power and water balances. As a result, damage is done to the environment, primarily to water and air basins and to land resources. Agricultural areas (arable land and pastures) and the land of Unified State Forest Resources have often been taken away. A serious deficit of water resources has occurred in a number of places.

For the purpose of overcoming these departmental tendencies a definite line of development of the industry of economic regions in the European part of the USSR is implemented mainly through the retooling and reconstruction of existing enterprises with a limitation of the construction of new and expansion of existing energy and water, as well as materials and metal, intensive production facilities. The latter consume raw materials and semifinished products brought from remote areas and the bulk of the finished output is transported beyond the region's boundaries. Such an approach will make it possible to ensure the saving of national economic expenditures, to relieve transport of inefficient operations, to intensify the all-Union specialization of the region's industry in the production of advanced, new articles, machinery and equipment. An accelerated transition to the intensive path of development in the country's most developed regions requires an increase in the rates of economic growth in them primarily through a buildup in the capacities of the established enterprises as a result of their reconstruction, retooling and modernization, as well as an improved utilization of existing capacities, and only then through the construction of new enterprises on the basis of their careful selection in the interest of intensification of the all-Union specialization of the region's economy.

The decisions of the 26th CPSU Congress and the December (1983) Plenum of the CPSU Central Committee point to the need to fundamentally improve the utilization of existing productive fixed capital, which promotes the growth of output without substantial one-time expenditures. This is especially important for industrially developed economic regions in the country's European part, where the placement of new industrial construction projects should be limited.

The utilization of existing fixed productive capital can be increased in two ways, that is, through an increase in the length of operation of equipment and units (extensive) and in the volume of output in a unit of time (intensive). The first way is attained primarily through an increase in the shift coefficient and a decrease in intrashift equipment downtime. Practice shows that even this simplest way is highly effective. An improvement in the utilization of equipment in a shift and a rise in the shift coefficient from 1.4 to 1.7-1.8 make it possible to increase, according to our calculation, output by 20 to 25 percent. However, so long as intrashift equipment downtime in the basic production of machine building plants reaches 13 to 17 percent of the worked machine tool shifts, the shift coefficient of equipment operation, on the average, does not exceed 1.25 to 1.35.

In light industry the underutilization of the commissioned capacities reaches 10 to 20 percent. The shortage of manpower, personnel turnover, shortcomings in labor organization, disruption in technological processes, lack in a number of cases of the necessary proportionality among individual groups of equipment, which are the elements of a single technological process, and breaches of contractual obligations are the basic reasons for the incomplete utilization of fixed capital. Sometimes the utilization of the capacities of basic production facilities is limited by the technical backwardness of auxiliary and subsidiary operations. An improvement in the utilization of capacities in the region's textile industry is hampered by the disproportion in the capacities of spinning, weaving and finishing production facilities. According to our calculations, at enterprises with an insufficiently high level of utilization of existing capacities the rates of increase in the capital-labor ratio often exceed 1.5- to 2-fold the rates of labor productivity growth and a decrease in output-capital is accompanied by a drop in the level of profitability.

It seems that, to improve the utilization of existing capital, it is necessary to take measures to retain workers, who have received the necessary training and have production experience, at enterprises and to fight against work time losses. Manpower turnover is still significant. Often it is the reason for an insufficiently rapid mastering of newly developed capacities and for the attainment of planned indicators of production efficiency.

A rise in the shift coefficient of equipment needs additional resources of skilled manpower, which should be recruited, trained and in a number of cases provided with housing and social and engineering infrastructure projects. In our opinion, in highly developed economic regions it is necessary to plan the increase in output through an improvement in the utilization of productive fixed capital and to redistribute in accordance with the planned procedure manpower according to an organized recruitment and limits for this purpose in the first place.

In our opinion, there is an urgent need to determine in accordance with the planned procedure the shift indicators of enterprise operation and on the basis of them to plan labor and wage indicators. Among the measures stimulating an increase in the shift coefficient of enterprise work the following can be proposed:

To establish differentiated standards of depreciation deductions, increasing them for enterprises operating in two shifts (at present depreciation norms do not take into consideration the shift coefficient of equipment operation);

to make the payment for capital dependent on the conditions of equipment operation;

to lower the rates and prices for services provided to an enterprise (electric power, water and so forth) operating in a second shift;

to develop and introduce differentiated rates and prices, increasing them for workers employed in a second shift.

An acceleration of the rates of reconstruction in industry acquires special importance for extending the intensification of production in the Central Economic Region and other most developed economic regions. Despite certain advances in the area of reconstruction and its high efficiency, a considerable number of obsolete enterprises and a significant amount of obsolete equipment remain now. The existence of metalcutting lathes used for many years in the structure of the machine tool pool increases production costs and labor expenditures almost 1.5- to 2-fold as compared with the utilization of modern equipment. In motor transport in the last 10 years the proportion of motor vehicles used for 8 to 10 years increased by more than 12 percent. This raises transport costs approximately 1.5-fold. The sources of financing for reconstruction are insufficient. Part of the depreciation allowances at the rate of 2 to 3 percent of their average annual value and of the production development fund within 1 to 1.5 percent of the indicated amount is assigned for the renovation of fixed productive capital. A shortage of the equipment and capacities of specialized construction and installation organizations engaged primarily in reconstruction is noted. Therefore, the period of reconstruction greatly exceeds the standard period. At 47 out of 114 enterprises of 7 machine building subsectors, whose materials we analyzed, the planned period reached 10 to 20 years, at 23, 5 to 10 years and at 44, less than 5 years. The indicated periods are determined on the basis of the actual limits of financing. The volumes of incomplete construction connected with the reconstruction of enterprises often exceed the standard limit 2- to 2.5-fold. The need for the intensification of the rates of reconstruction requires the introduction for highly developed economic regions of the type of the Central Economic Region of preferential systems for the economic stimulation of this process, in particular the creation of a stable source of financing making it possible to replace up to 10 or 12 percent of the equipment annually, to renovate the active part of the fixed capital in approximately 8 to 10 years, to increase the share of depreciation allowances for renovation, to raise the proportion of capital expenditures on reconstruction, modernization and retooling in the total volume of one-time expenditures to 80 percent for the



Central Economic Region and to 90 percent for Moscow and the share of new equipment for the replacement of old equipment, to 70 or 80 percent of its total deliveries and to establish specialized organizations for the reconstruction and retooling of enterprises. The possibility of assigning essentially all depreciation allowances for these purposes should be examined.

As practice shows, during reconstruction not only a fundamental renovation of existing fixed capital, but also a significant increase in output, rise in its quality, labor productivity growth and improvement in working conditions, is attained. As a result of reconstruction, owing to the introduction of new equipment and technology and to the automation and mechanization of production, according to our estimates, the increase in labor productivity, on the average, comprises 10 percent during a 5-year period and in the nearest future the importance of this indicator can rise from 12 to 16 percent. An improvement in the management and organization of production ensures an increase of 3 to 6 percent in the indicator of labor productivity during a 5-year period.

In the region's industry there are also other significant potentials for labor productivity growth connected primarily with a fundamental improvement in the utilization of the employed manpower (shortening of idle time, decrease in turnover, rise in labor discipline, improvement in the vocational guidance of youth and an extensive introduction of the Shchekino method and the brigade contract). A rise in the level of the capital-labor ratio, which still lags behind the average indicator in the RSFSR, is of special importance for the further growth of labor productivity. The reason for this lies in the fact that for many years fewer capital investments have been assigned for the renovation of fixed industrial-productive capital and, especially, its active part than for new construction. Labor productivity growth and personnel retention often are limited by the fact that 40 percent of the workers are engaged in manual work and approximately one-half, in subsidiary and auxiliary work. Further labor productivity growth is possible through the mechanization of heavy manual work in the grading and stacking of timber and in loading-unloading, transport and warehouse operations. An acceleration of the rates of renovation of obsolete fixed productive capital and of mechanization and automation of labor intensive and heavy work in basic and auxiliary production give a vast economic effect and ensure the implementation of a labor saving policy.

The intensification of industrial production and improvement in its structure are attained through the establishment of higher rates of development of specializing sectors of economic regions. In the Central Economic Region this applies primarily to machine building. The existence of skilled personnel (approximately one-third of the workers of the sixth category and engineering and technical personnel in the RSFSR are employed in the sector), of a developed production potential and of a powerful planning-design and experimental base determines the high efficiency of development in the region of the most advanced fine and precise machine building sectors of a low and medium metal intensiveness based on highly skilled labor and requiring small specific energy expenditures. Such sectors include instrument making, machine tool building (production of precision, automatic, semiautomatic and single-design machine



tools, automatic lines and program-controlled machine tools), the tool and electrical engineering industry (without the cable industry) and so forth. It is advisable to develop these sectors, which are noted for a high labor intensiveness and a low and medium metal intensiveness, at the highest rates. Rates at the level of the average rates in the machine building sector as a whole are possible for the subgroup including other machine tool building, the motor vehicle and bearing industry, road construction and municipal machine building, machine building for light industry and production of household appliances with average parameters of labor intensiveness and indicators of metal intensiveness higher than in the first subgroup. At the same time, taking into consideration the considerable possibilities for the development of this subgroup of sectors of long-term specialization in the Central Economic Region (existence of established capacities and of a developed scientific research, planning-design and experimental base), it is advisable to limit the range of new construction projects for their more uniform placement on the country's territory. The development of tractor, agricultural, energy, transport and transport lifting machine building, as well as of the production of articles for general machine building purposes, will be efficient within limits meeting the need of central RSFSR regions for their output. The import of metal and export of finished products increase the production costs of the articles of this group by 8 to 11 percent. Subsectors with the highest metal intensiveness selling their output far beyond the boundaries of this region are the least effective for it.

Owing to the lack of local metallurgical raw materials and the weak development of ferrous metallurgy, more than 92 percent of the need of the Central Economic Region for finished ferrous rolled metal products is covered by their import. This increases the transport component of the production costs of the most metal intensive machine building sectors to approximately 18 percent. At the same time, about 80 percent of the machine building output (in terms of the value of commodity output) produced in the region, including metal intensive products (80 percent of the excavators, 85 percent of the metal cutting lathes and forging and pressing machines, 80 percent of the trucks and so forth), is exported.

The need for the realization of the USSR Food Program and of the decisions of the CPSU Central Committee and the USSR Council of Ministers on an accelerated development of agriculture in the RSFSR nonchernozem zone requires a buildup in the capacities of tractor and agricultural machine building on the basis of the expansion and reconstruction of existing enterprises and the development of a system of machines for the mechanization of the cultivation and harvesting of the most labor intensive agricultural crops--flax, potatoes, vegetables and fodder.

It is necessary to limit the development in the region of metal intensive machine building sectors within the local need for their output. This will make it possible to lower the expenses on the transportation of metal intensive machine building and metalworking products from here to the country's economic regions with a developed metallurgical base. Calculations have shown that the machine building sectors that produce equipment for timber, mining, metallurgical, chemical, petrochemical and gas extracting industries are the least effective for the Central Economic Region. The expenditures on the import of metal and export of the freight intensive and bulky articles of these sectors to the regions of the Urals, Siberia and the Far East reach 18 to 20 percent of their production costs.

The improvement in the structure of machine building and metalworking on the basis of a transition from article to part and technological specialization and the establishment of specialized assembly production facilities, enterprises for the production of articles and services for general machine building purposes and large repair bases are important directions in the intensification of the development of this sector in the Central Economic Region, which are noted for a high efficiency (expenditures of live and embodied labor are reduced by a factor of 1.5 to 2.5). The development of intersectorial specialization presupposes, along with the liquidation of small production facilities, the functioning of specialized plants and shops optimal in their capacity, which manufacture technologically and structurally uniform products. The national economy incurs big losses owing to the fact that 5 out of 10 machine building enterprises in the region still produce castings and 7, forgings and stampings for their own needs. The production costs of products for intersectorial purposes at nonspecialized enterprises are higher by a factor of 1.5 to 2.6, labor productivity is lower by a factor of 2 to 2.5 and metal consumption is 15 to 20 percent higher than at specialized enterprises. The latter account for only 15 percent of all the performed work in repair production.

Specialization and increase in the technical equipment of repair and assembly operations are important factors in the intensification of production in machine building. With the nonspecialized form of organization of repairs the quality of work is low (the initial life of equipment is restored 60 to 80 percent), the period of operation doubles or triples and expenditures often exceed the cost of new equipment 1.5- to 2-fold. In a number of sectors assembly operations need overall mechanization (up to 80 percent of them are performed manually and the duration reaches 25 to 30 percent of the entire production cycle).

The further intensification of public production requires a systematic realization of the directives of the 26th CPSU Congress and of the December (1983) Plenum of the CPSU Central Committee on lowering the metal intensiveness of machinery and equipment and reducing metal losses. The solution of this problem is of special importance for the country's economic regions with highly developed machine building based primarily on imported rolled metal products. A reduction of metal losses requires a constant rejection of machining methods (in which one-half of the metal is used and the second goes to waste) and an extensive introduction of advanced technology of manufacture of billets (processes of precision stamping--cold, hot and sheet stamping, pressure die casting and sizing). Along with the solution of problems of development of machine building matters of metal supply require much attention. The development of ferrous metallurgy in the Central Economic Region is limited both by the characteristics of this sector and by local conditions. Ferrous metallurgy--a big consumer of fuel and water--requires sizable territories for the placement of enterprises of a full metallurgical cycle near big rivers. This circumstance, as well as the lack of local fuel and raw materials, and the tasks of environmental protection under conditions of a high level of concentration of productive forces make the construction of large full-cycle metallurgical enterprises in the Central Region inadvisable. An evaluation of the basic factors in the development of this sector in the Central Economic Region and other regions with similar conditions (from the standpoint of fuel and

water intensiveness, availability of sites and construction conditions) makes it possible to draw a conclusion on the efficiency of utilization in them of an advanced, new form of organization of ferrous metallurgy presupposing the placement of territorially separate production facilities, that is, for rolled metal products, in the region and for cast iron, steel and cast billets as the most fuel and water intensive production facilities, beyond its boundaries. According to the calculations of specialists, such a separate placement of a metallurgical plant for slab production of a capacity of 20 million tons and of two rolled metal product plants will make it possible to reduce capital expenditures by 100 million rubles as compared with the variant of the establishment of a single full-cycle plant in one place. When rolled metal product plants utilize imported semifinished rolled metal products, transport costs are reduced to one-fifth as compared with the import of concentrated ore by metallurgical enterprises. The development of the fuel and power base requires special attention. With the considerable scale of fuel and power consumption of the Central Economic Region its own fuel resources are 80 times lower than the average Union resources and approximately 10 times lower than in the country's European part (including the Urals). Therefore, problems of an efficient utilization of fuel according to scientifically substantiated standards, reduction of losses and overall utilization of all fuel and heat waste are of great importance for the region. The efficiency of utilization of secondary resources (coal concentration waste, blast furnace and coke oven gas, flue gases of petroleum refining and other heat intensive sectors of industry, heat of drained water and steam and so forth) is quite high when they are used both as technological fuel and for steam generation with the subsequent production of electric and thermal power. At the same time, the possibility of reducing the need for initial fuel through the utilization of secondary power resources reaches from 20 to 60 percent and more. Moreover, at present they are utilized only 15 to 20 percent, which is limited not only by subjective reasons, but also by the shortage of the necessary equipment. Furthermore, a reduction in the expenditures of fuel on the generation of electric power and fuel is connected with the elimination of small inefficient electric power plants and boilers (with obsolete equipment). The construction of modern TETs /heat and electric power plants/ and large boilers makes it possible to obtain a considerable economic effect (to lower specific capital investments by a factor of 2.5 to 4 and the specific consumption of fuel, 1.5) and to improve the state of the air basin. The shortage of fuel resources in the Central Economic Region and other regions in the country's European part predetermines the advisability of an accelerated development of nuclear electric power plants, including nuclear heat supply plants. It is well known that AES /nuclear electric power plants/ of a capacity of 4 million kW can have better indicators of specific calculated expenditures per unit of released electric power than TES /thermal electric power plants/ on Kuznetsk and Donetsk coal, which are widely used in European regions. On the whole, the calculated expenditures per unit of AES capacity are lower than the same indicators at ordinary electric power plants located in the central, western and southern regions of the country's European part operating on solid fuel, especially imported from remote areas, but are second to them as compared with TES consuming natural gas and mazut. At the same time, every million kW of AES capacity created in these regions contributes to an annual reduction of approximately 2 million tons of standard fuel in the flow of fuel from the east to the west. An accelerated



construction of gas turbine and water storage electric power plants is an important direction in the development of electric power engineering in highly developed economic regions, which acutely need a daily regulation of electric load schedules, especially during peak hours. They contribute to an increase in the efficiency of operation of the entire power system and in the effectiveness of capital investments in power construction. An improvement in the utilization of power capacities requires the development of intersystem, as well as intraregional, distribution networks.

It is preferable to determine efficient directions in the improvement in the structure of the fuel and power complex of the Central Economic Region by comparing the calculated and closing expenditures on the extraction, processing (concentration), transport and burning of various types of fuel and electric power (with due regard for the possibilities of the country's fuel and power balance). On this basis it has been disclosed that, along with nuclear fuel, natural gas and Kuznetsk and Donetsk coal should be considered the more preferable types of fuel in the region. The development of the petroleum refining industry is effective on a scale ensuring the satisfaction of the local need for light petroleum products along with the intensification of petroleum refining, reduction in mazut production and gradual rejection of its use as boiler fuel. The development of the coal industry is advisable within the limits of compensation for disused capacities. It is possible to increase the competitiveness of local coals on the basis of their overall utilization (use of iron pyrite, aluminum containing slag, ash and enclosing solid rocks). Peat extraction should be oriented primarily toward the interests of meeting the needs of the agrarian and industrial complex.

The determination of the ways of intensification of the structure of the chemical and petrochemical industry is advisable on the basis of an analysis of the comparative efficiency of production of its basic products in main producing and consuming regions (with the use of calculated expenditures), power, water and labor intensiveness, transportability of raw materials and finished output and intraregional production and consumption. This has made it possible to substantiate the concept proceeding from the orientation toward the preferential development in the Central Economic Region of the least power and materials intensive subsectors, which are especially complex and small and utilize local raw materials. Long-term specialization subsectors include the mining and chemical industry (extraction of phosphorites), basic chemistry (output of nitrogen and phosphorus fertilizers, including complex and concentrated ones), production of nonpower intensive synthetic resins and plastics, fiberglass materials, varnishes, paints and chemical reagents and household chemistry. Along with this the establishment of new power intensive production facilities for synthetic fiber, plastics, tires and industrial rubber articles, which utilize raw materials brought from remote areas and sell the bulk of their output beyond the region's boundaries, should be given up. The production of rubber economically gravitates toward regions of cheap hydrocarbon raw materials and fuel. Therefore, the calculated expenditures on its production in the Central Economic Region are 20 to 30 percent higher.

The growing needs for the chemicalization of agriculture require a balanced development of the production of mineral fertilizers and chemical plant protection agents. An improvement in the quality of mineral fertilizers is connected



with the attainment of optimal correlations of basic groups of nutrients and an expansion of the production of complex and single highly concentrated fertilizers.

The fullest utilization of industrial waste is one of the ways of lowering the materials intensiveness of production. This problem is of especially serious importance for the Central Economic Region, where there are no major primary resources of minerals. With the utilization of secondary resources expenditures on raw materials and fuel brought from remote areas decrease and the efficiency of public production increases. For example, the resources of copper scrap in the Central Economic Region make it possible to ensure the operation of a copper smelting plant and 70 percent of the waste of nonferrous metal and metal scrap is processed. The level of utilization of iron (coal) pyrite--important waste in the extraction and concentration of coal, from which it is possible to obtain a concentrate with a content of 47 percent of sulfur and refractory clay for chamotte production--is low. The cost of sulfur extraction from these incidental raw materials is one-third of that from the waste of nonferrous metallurgy. However, their dumps increase annually, occupying ever newer sections. The bulk of the blast furnace, dump and power slag and ash do not find application and granulated slag and flux limestone of ferrous metallurgy are utilized poorly, although it is possible to obtain from them high-grade cement and many building materials (panels, blocks and light ash fillers for the production of concrete and panels) with lower expenditures than from basic raw materials. For example, the cost of 1 ton of cement from slag is lowered by 3 to 5 rubles and with ash additives, by 2 rubles. The manufacture of panels from ash and slag makes it possible to lower the production cost of 1 cubic meter of structure by 10 to 18 rubles and the weight of walls, as compared with brick walls, to one-fourth or one-fifth. The ash of coal near Moscow is a valuable raw material for the alumina industry. Its content of alumina is 1.4 times higher than that of many types of aluminum containing raw materials. Therefore, according to the data of the State Institute of Applied Chemistry, the calculated expenditures on the production of 1 ton of alumina are as follows: from the ash of coal near Moscow, 1.5 rubles, from bauxite, 20 to 36 rubles, from nepheline concentrate, 26 rubles and from kaolin, 18 rubles. Millions of tons of enclosing rocks--waste of coal extraction and the mining and chemical industry (sand, gravel and hard rocks)--annually accumulate in the Central Economic Region, whereas stones for rubble are often brought from afar (1,000 to 1,500 km and more).

Light, especially textile, industry has reached an exceptionally high level of concentration in the Central Economic Region. The further improvement in the placement of the sector's enterprises throughout the country's territory by bringing them closer to consumption regions dictates the advisability for its development in the region, basically through the reconstruction of existing enterprises. This applies primarily to the cotton and wool industry. One-time expenditures on these purposes are 30 to 40 percent lower than during new enterprise construction. The development of flax, footwear, knitwear, haberdashery and sewing industries in the region is promising. The development of the flax industry requires an expansion of the local raw material base, rise in the technical level of existing and establishment of specialized, new capacities for initial flax processing, development of systems for a quality

cleaning of flax fiber and increase in the share of consumer fabrics in the total production volume. Building up capacities for the production of non-woven materials, for the initial processing of leather and wool and for stitching and cutting production facilities in the footwear industry, ensuring optimum proportionality in basic technological processes of the textile industry and expanding the assortment and improving the quality of output are also of great importance.

Intensification of the directions in the development of the timber, woodworking and pulp-paper industry in the Central Economic Region presupposes an overall utilization of local resources of small and low-grade coniferous and broad leaf wood, reduction in the felling of valuable coniferous forests, a sharp increase in the import of sawn, instead of round, timber, an efficient utilization of timber sawing and woodworking waste, maximum utilization of waste paper and an accelerated increase in the output of wood boards and cardboard and in the capacities for the chemical and mechanical processing of raw wood and for the manufacture of furniture with an improvement in its assortment and quality.

The December (1983) Plenum of the CPSU Central Committee pointed out that the "present scale and rates of development of productive forces require a change in the attitude toward problems connected with environmental protection and an efficient utilization of natural resources. This is a task of great economic and social significance."<sup>1</sup> This directive is of special importance for the country's highly developed economic regions. The need to eliminate undesirable shifts in the economic balance of the environment caused by the rapid development of productive forces through the intensification of measures for the protection and improvement of utilization of water, land, forest and recreational resources and the air basin has become the first and foremost problem for them.

The limitation of water resources in the economic regions of the country's European part presupposes the need for the establishment of strict control over an efficient and economical utilization of water, prohibition of the use of scarce underground water for industrial purposes, allocating it primarily for drinking needs, a fundamental solution of the problem of a quality purification of sewage, adoption of effective measures to protect reservoirs, development of circulating and closed water supply systems, general transition to water use requiring payment, elimination of the placement of new and expansion of existing water intensive enterprises and production facilities and adoption of measures to increase the rate of stream flow in rivers through runoff control, intra- and inter-basin redistribution and acceleration of the work on the transfer of part of the runoff of northern rivers (lakes) to the Volga basin.

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1. "Materialy Plenuma Tsentral'nogo Komiteta KPSS 26-27 dekabrya 1983 goda" /Materials of the Plenum of the CPSU Central Committee on 26-27 December 1983/, Moscow, Politizdat, 1983, p 16.

The preservation of the ecological balance in regions of the country's European part deficient in forests requires that environment forming, hydrometeorological and sanitary importance, not the industrial value of a forest or its proximity to the consumer, be taken as the main criterion of utilization of forest resources. It is also necessary to reduce the volumes of felling of coniferous species and to expand the work on an accelerated regeneration of the most valuable forests. The protection of the air basin of cities requires the adoption of radical measures to lower the level of pollution of the atmospheric air by motor transport and industry. The time has come to prohibit the seizure of valuable agricultural, primarily arable, land for non-agricultural purposes and to improve the utilization and protection of health-resort and recreational resources.

Among the regional factors in the intensification of public production those that are directed toward an improvement in the territorial organization of productive forces play an important role. For highly developed economic regions this is a long process similar to the concept of reconstruction. A considerable nonuniformity in the placement of productive forces and the population characterizes the Central Economic Region, like other highly developed economic regions in the country. It was manifested in an accelerated urbanization, excessive concentration of the population in big cities and industrially most developed oblasts, deterioration of living conditions in them, lag in the industrial development of a number of oblasts and small cities and emergence of disproportions in the placement of the productive and social infrastructure. An elimination of the negative consequences in the sphere of the territorial organization of the region's economy requires significant one-time expenditures and lowers the efficiency of public production.

A purposeful approach to problems of reconstruction of the territorial organization of the economy of the most developed economic regions, which meets the requirements of the law of a planned and proportional development of productive forces during the period of developed socialism, presupposes the need for an overall consideration of economic, social, architectural-planning and sanitary-hygienic factors. The following are the basic paths of this process for highly developed economic regions: gradual approximation of the level of social and economic development of autonomous republics, krais and oblasts along with the prohibition of the construction of major new construction projects not connected with services for the public and construction needs in the most industrially developed of them; accelerated development of oblasts lagging in the level of industry; strict planned regulation of the development of major and big cities and city agglomerations; stimulation of the maximum possible growth of medium and small cities and urban-type settlements; establishment of special-regime zones for territories most valuable in terms of nature or in acute need of the protection of the air basin (for example, places of concentration of valuable architectural, historical, cultural and art monuments) around important reservoirs and major cities; selection of advanced, new forms of production and territorial integration in industry and agriculture; consolidation and reconstruction of the rural settlement system with due regard for modern tendencies in the development of the agroindustrial complex. As experience has shown, the establishment of groups of industrial enterprises (industrial complexes) in major cities and the regulation of existing ones reduces sites by approximately 20 percent, the length of motor

roads and railways within zones, by 25 to 30 percent and capital investments by approximately 10 to 12 percent. The process of settlement concentration and the transition to the construction of bigger villages aimed at gradually bringing the urban and rural way of life closer together lowers capital investments by 10 to 15 percent and operating expenditures, by approximately 10 percent. The establishment of production zones in major settlements arising as a result of the placement of production, subsidiary-auxiliary and service projects of the agroindustrial complex will make it possible to reduce one-time expenditures by 10 to 15 percent and operating expenditures, by 6 to 8 percent as compared with the variants of their dispersed construction.

The utilization of the regional potentials for the intensification of public production in highly developed economic regions will contribute to an increase in their contribution to the country's national income. To attain this goal, it is necessary to intensify the combination of national economic, sectorial and territorial aspects of management and to raise the role of local soviets of people's deputies on territories subordinate to them. In our opinion, it is advisable to supplement the organizational structure of territorial administration in highly developed economic regions of the country's European part with staffs of plenipotentiaries of the USSR Gosplan.

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CSO: 1820/168



## REGIONAL DEVELOPMENT

### INCREASED LOCAL SOVIETS PARTICIPATION ADVOCATED

Moscow PLANOVYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 62-68

[Article by N. Aleksandrov, chairman, Saratov Oblispolkom: "Local Soviets and the Management of the Economy"]

[Text] The communist party attributes exceptionally great importance to the work of the Soviets of People's Deputies. The documents of the 26th Party Congress and the decisions of subsequent plenums of the Central Committee plot a clear course toward increasing the role of the Soviets in fulfilling the tasks of building communism.

The work of the Soviets has particularly been stepped up after adoption of the resolution by the CPSU Central Committee, the Presidium of the USSR Supreme Soviet and the USSR Council of Ministers entitled "On Further Increasing the Role of the Soviets of People's Deputies in Building the Economy."

Speaking at the April (1984) Plenum of the Central Committee, CPSU Central Committee Secretary General, comrade K. U. Chernenko stressed that "our economy will benefit greatly if the Soviets make it a rule to critically and objectively evaluate the work of economic managers at all levels."<sup>1</sup>

The Soviets of People's Deputies in Saratov Oblast see their main role as that of bringing to realization the policy of the party, which is directed at the most complete satisfaction of the basic interests of the workers, the continued increase of their well-being, the real implementation of the constitutional rights and freedoms of citizens. and the support of law and order.

The executive committees of the Soviets of People's Deputies work in conjunction with the deputies, which actively participate in the preliminary review of projects for plans and local budgets, the identification of additional reserves in industry and agriculture, in increasing the effectiveness of production, and in control and verification of fulfillment of the decisions made by the Soviets. In recent years the authority of the deputy groups and positions has noticeably increased. Uniting the deputies by territorial and production principles, these groups and positions comprise the nucleus of the production collectives.

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<sup>1</sup> "Materialy Plenuma Tsentral'nogo Komiteta KPSS 10 aprelya 1984 goda" [Materials of the Plenum of the CPSU Central Committee, 10 April 1984], Moscow, Politizdat, 1984, p 10.

Voluntary service has become very widespread in the work of the Soviet apparatus. Presently in the ispolkoms [executive committees] of the city and rayon Soviets there are 94 non-staff sections (employing around 1000 people). These deal with trade, public dining, domestic services, industry, culture, communal management and improvements.

The role of the people's deputies and organs of state authority in developing the initiative of the workers has increased even more greatly after adoption of the Regulation on Labor Collectives. The regulation gives much leeway for the development of socialist competition and creation of an environment of high activity, exactingness and discipline in each collective.

The questions of planning the entire economic management mechanism are presently being brought to the forefront. Their solution requires creative endeavors, experiments, organizational work and psychological restructuring.

The main instrument in the realization of the party's economic policy which regulates the activity of all segments of the national economy is the system of interrelated plans. In recent years the Soviets of People's Deputies have begun to make broader use of their huge capacities in the interests of all of society. They have done this by means of participating in the development of scientifically substantiated plans and by setting higher requirements for the comprehensive character of plans for the oblast's economic and social development. This ensures the effective application of labor, material and financial resources for purposes of increasing labor productivity and the harmonic development of the productive and social spheres.

The organ which coordinates the activity of the oblast administrations and sections for development of plan outlines and the interaction with the superior associations, enterprises and organizations is the oblast Soviet ispolkom planning commission.

As a result of the implementation of a number of measures by the party and the government on the development of planning in light of the new problems facing territorial planning, the legal status of the local planning organs has increased. The planning commission chairmen have also become the deputy chairmen of the ispolkoms in the appropriate Soviets. The influence of the commission on the work of enterprises and organizations, regardless of their administrative subordination, has intensified. Exercizing the rights which have been given to them, the Soviets perform extensive organizational work within the limits of their jurisdiction with all the enterprises and organizations located within their territory.

For purposes of intensifying the effect of the local Soviets on planning the integrated development of the territory, free plans for the production of consumer goods, local building materials, and residential, communal and cultural-domestic construction have been developed within the past two years. In reviewing the basic project plan indicators for enterprises which are subordinated to higher authorities, the planning commission prepares proposals directed at ensuring the comprehensive development of the oblast's economy. The oblispolkom [oblast executive committee] introduces these to the appropriate

ministries and the RSFSR Gosplan. Thus, 10 proposals were made in accordance with the plan project for 1982, over 30 for 1983, and 28 proposals for 1984.

In reviewing the plan project for Minenergo [Ministry of Power and Electrification] for 1983, the oblispolkom did not agree with the insignificant capital investments provided by the ministry for the development of heating networks in Saratov. This was motivated by the fact that the use coefficient of the production capacities of TETs-5 [Heat and Power Station 5] comprised only 30 percent, while the city serves over 400 low capacity boiler rooms. Proposals were introduced for increasing the rate of production growth for consumer goods throughout the enterprises of Minelektrotekhprom [Ministry of the Electrical Equipment Industry], Minkhimprom [Ministry of the Chemical Industry], Minkhimmash [Ministry of Chemical and Petroleum Machine Building], Minstankoprom [Ministry of the Machine Tool and Tool Building Industry], Minavtoprom [Ministry of the Automotive Industry] and Ministroymaterialov [Ministry of the Construction Materials Industry] of the USSR and RSFSR, as well as others.

The planning commission is performing extensive work on preparing proposals and conclusions on the schemes of development and location of production forces with consideration for natural and material resources, the work force, and the harmonious development of minor cities. These proposals are reviewed by the oblispolkom interdepartmental commission and forwarded to the appropriate ministries and departments. For example, in 1983 alone the oblispolkom presented conclusions on 23 sectorial schemes of development and location of enterprises up to the year 2000 and reviewed 18 applications from ministries and departments on the construction of new and the reconstruction of operating enterprises. Not one regional planning scheme or one city master plan is confirmed without coordination with the oblispolkom. This order has a great effect on the preparation of projects for long-term integrated plans, their quality, and to a significant degree also has a positive effect on the development of the oblast's economy.

Without reducing their attention to questions of local management and service to the population, the Soviets of People's Deputies have noticeably expanded their on-site coordination and control functions. They have also increased their influence on the activity of all enterprises and organizations, regardless of their departmental affiliation, in their creation of the necessary conditions for the work and recreation of the workers. The Soviets of People's Deputies have worked out and ratified at their sessions the five-year plans for the economic and social development of the oblast for 1981-1985, as well as for 1981, 1982, 1983 and 1984.

The practical experience in the preparation and realization of measures for fulfilling plan assignments, for comprehensive development of enterprises, staffing, and improving the living and working conditions of the workers implemented in conjunction with the republic ministries and departments which has been gained in recent years has been directed toward the development of sectorial and territorial planning. Nine joint resolutions have been adopted on long-term questions of development of individual sectors subordinate to the Soviets. These deal with the light, textile, food, meat-dairy and local industries, as well as communal management, trade, domestic services and the building materials industry.

The effectiveness of these measures is clearly confirmed by the example of the development of the oblast's construction industry base. Here new capacities have been introduced for manufacturing 400 million units of brick, 390,000 cubic meters of prefabricated reinforced concrete constructions and parts for large-panel house building, 3.3 million cubic meters of rubble, and 165,000 cubic meters of keramzit per year.

The Engels Building Materials Plant has mastered the production of 300,000 square meters of ceramic facing slabs per year. The Saratov Building Materials Plant -- 100,000 cubic meters of cellular concrete, and the Khvatov Glass Plant has been prepared for starting production of 27,000 square meters of synthetic granite -- a new finishing material.

The strong material-technical base of the construction industry enterprises which has been created facilitates the continued growth in the volumes of capital investments and construction-installation work. In 1983 they comprised 1,460,000,000 rubles. In a word, the scope of capital construction in the oblast is huge. It is directly tied with the realization of our plans for increasing industrial production, strengthening the agricultural sectors, and improving the housing and cultural-domestic conditions of the workers. In the 3 years of the current 5-year period, 147 capacities at enterprises on instrument making and metal processing, chemistry, petrochemistry, electronics and wood processing have been placed into operation or reconstructed. The construction of an atomic power station, plants producing agricultural machinery for mineral fertilizer application in the city of Krasnoarmeysk, and shut-off valves in the city of Pugachev and others is proceeding at an accelerated pace.

The closest attention on the part of the party organizations and local organs of power is given to facilities associated with the realization of the USSR Food Program. Two start-up complexes have been introduced into operation on schedule at the Saratov Broiler Poultry Farm, as well as the Atkarskiy Baked Goods Plant, a confectionary factory in the oblast center, 9 hectares of hothouses in the Vesna [spring] Hothouse Combine, 500 hectares of fish raising ponds, and buildings for keeping and feeding cattle to accommodate 400,000 head. New elevator bins and grain warehouses have been built, and vegetable, fruit and potato storage facilities have been expanded by 20,000 tons. Within the framework of the agroindustrial associations, 58 million rubles have been invested for the expansion of capacities for processing agricultural raw materials and introducing waste-free technology at enterprises of the meat and dairy, food, bakers and other sectors of industry.

The subject of particular concern for the party, soviet and economic management organs is land reclamation. Thanks to continued aid from the state, Saratov Oblast has become the largest zone of irrigation agriculture. In the current five-year period alone, the irrigated fields here have increased by 84,000 hectares -- almost 10,000 more than provided by the plan. Their area has reached 500,000 hectares and, regardless of the weather-climatic conditions, this area has become a strong base for obtaining guaranteed crops of vegetables, coarse and grassy fodder, etc.



The counter plans and socialist responsibilities of all the labor collectives for 1984 all reflect the proposals of the CPSU Central Committee on increasing the labor productivity by 1 percent over the plan and additionally reducing the cost of production by 0.5 percent. Every percentage point of increase in labor productivity in the sectors of our oblast's national economy means the additional output of 2,000 tons of chemical fibers, over 5,000 refrigerators, 21 trolley cars, 34,000 tons of cement, 600,000 rubles worth of furniture, etc. An additional 1,000 apartments may be built due to the increase in labor productivity, and 30,000 centners of meat produced in agriculture, 125,000 centners of milk, and 500,000 centners of grain.

Exercizing the rights which have been given to them, the oblast's Soviets of People's Deputies are performing extensive organizational work on the rational application of the productive and scientific-technical potential under the management of the party organs. This is evidenced by certain results of the current five-year plan.

On 25 December 1983, the oblast's industrial enterprise collectives fulfilled the plan for the 3 years of the 5-year plan ahead of schedule. During this time, the volume of production increased by 13.4 percent. The amount of production realized was 161 million rubles worth over the plan, with almost all the growth obtained due to increase in labor productivity.

In 1983 the growth rate in the volume of realized production comprised 5.4 percent. This is the highest indicator in the past 10 years.

Questions of the further expansion of production and improvement in the quality of consumer goods occupy a special place among the primary tasks of soviet organs on improving the well-being of the workers. The prospects for saturating the market with the necessary industrial goods were determined in 1980 at the session of the oblast Soviet of People's Deputies. Comprehensive programs for the development of enterprises in the light, food and local industries were developed and ratified at the beginning of the current five-year plan.

In the elapsed 3 years of the five-year plan, the production of consumer goods in the oblast has increased by 12 percent, while the production of goods of cultural-domestic and household function has increased by 27 percent.

In 1983, over 48 million rubles worth of goods for the population were produced over the planned amount. Their production increased by 6.5 percent as compared with 1982. The annual output of goods in retail prices exceeded the plan assignment, and comprised 1 ruble 45 kopeks for each ruble of wages paid out.

The Soviets of People's Deputies implement control over the planning and production of consumer goods. Thus, in developing proposals for the plan outline for the production of goods of cultural-domestic and household function for 1983, 26 enterprises and 17 ministries took the remarks of the oblispolkom into consideration and increased the plan for the production of these goods by 12 million rubles.

Last year, the oblispolkom commission on the production and supply of consumer goods attracted small enterprises in the construction industry, agricultural technology, polygraphy and other sectors to production. Within the course of the year, these manufactured over 10 million rubles worth of various products.

At present all the enterprises, regardless of their specialization and administrative appurtenance, manufacture goods for the population.

Various forms of joint activity by industrial enterprises and trade organizations have been developed. A permanent exhibition of consumer goods has been organized at the "Torgovyy tsentr" [Trade Center] department store. It aids industrial enterprises in defining and utilizing production reserves for assimilating new products and increasing the output of goods which are in short supply on the market.<sup>1</sup> Seminars, business conferences, wholesale fairs, and meetings of artistic and interdepartmental councils on the production of consumer goods are held on the basis of this exhibition. Collaboration agreements between industrial and trade enterprises are also another form of cooperation which is becoming widespread.

Questions on agriculture occupy a central place in the work of the Soviets of People's Deputies. The creation of oblast and rayon agro-industrial associations headed by the first deputy chairmen of the Soviet of People's Deputies ispolkoms has increased their role and responsibility for fulfilling the tasks of the Food Program and improving the management of agriculture and the sectors serving it.

The oblast has considerable agricultural potential. The largest of the kolkhozes and sovkhoses (there are over 700 of them in the oblast) have 40,000-55,000 hectares of arable land, 1,500-1,800 cattle each, and up to 40,000 sheep. The overall cost of the fixed capital in the kolkhozes and sovkhoses exceeds 5.5 billion rubles, and the power-worker ratio comprises 42 horsepower per worker.

Questions of the effective application of the land -- the chief wealth of the kolkhozes and sovkhoses -- are constantly within the field of vision of the Soviets of People's Deputies. For these purposes, measures for the assimilation of scientifically substantiated systems of farming ratified by the oblispolkom in 1981 were developed and implemented at each farm and brigade. In accordance with them, the structure of the planted fields is being improved. Fodder production has been classed as a separate sector, the plots for cultures with the highest crop yields have been expanded, and the sowing of strong varieties of wheat has increased. Fodder fields comprise up to 14 percent, and crop rotation fields have been enlarged. A soil conserving system of cultivation is being widely introduced. In 1983 the volumes of flat-cut cultivation comprised over 50 percent of the fall plowing. Every year the application of herbicides and the introduction of organic and mineral fertilizers is being expanded, and seed-farming is being improved.

For the more effective utilization of the irrigated lands, farms have been designated at which programmed crop yield will be organized in the current year under the control of scientific-research institutes on an area of 80,000 hectares.

Organizational work has been stepped up on the widespread introduction of the most progressive forms of labor organization into agricultural production. In the current year, brigades organized according to the collective order will work around 2 million hectares of land.

All the field areas have been assigned to permanent brigades and teams working in the collective order. 190 brigades will work to raise fodder on an area of 21,000 hectares, using it to feed 70,000 head of cattle and 50,000 sheep. These brigades will be paid according to the end result of their labor. Measures for the development of animal husbandry occupy a special place in the program of agricultural development. These include measures on the specialization, concentration and cooperation of production, as well as on increasing the level of mechanization of labor consumptive processes. Monthly assignments on achieving productivity in cattle, production, procurements and quality of production are forwarded to all rayons and farms, and systematic control over their fulfillment is implemented.

At the present time there are 59 inter-farm enterprises and complexes operating within the oblast for feeding and raising cattle and hogs. These produce 22 percent of the meat. Sixteen complexes and large farms yield over 70 percent of the milk. Practically the entire volume of production of eggs and poultry is concentrated at the large poultry farms.

Today 28 percent of the oblast's population lives on the farm. They not only fully provide the residents of their oblast with food products, but also supply products to the union republic fund.

The workers of the fields and farms made their greatest contribution to the fulfillment of the Food Program in 1983. The volume of gross agricultural production comprised around 1,800,000,000 rubles. This was the highest level, even exceeding the record volumes for the harvests of 1973 and 1978. The plans for supply of grain, sugar beets, vegetables and cucurbit cultures, fruits and berries to the state have been successfully fulfilled. Our Homeland's granaries have been filled with 3,605,000 tons of bread.

The plans for procurement of all types of animal husbandry products have been realized and overfulfilled. The purchases of meat have increased by 5 percent since 1982, of milk -- by 6 percent, eggs -- by 7 and wool -- by 10 percent.

Today the main concern of the agro-industrial associations and the Soviets of People's Deputies is the strengthening and development of positive tendencies, the successful completion of wintering of the cattle, the organized implementation of spring field work, and obtaining a high crop yield.

All our efforts in economics are ultimately directed toward improving the living standard of the people. This is the main socio-political goal of our plans.

A broad social program is being successfully introduced in our oblast. Every year over 1.2 million square meters of housing is introduced, and over 100,000 people improve their housing conditions. Re-settlement into improved houses

from basements and barracks is being completed. The plan for 3 years of the current 5-year plan on the construction of schools, children's preschool institutions, hospitals, polyclinics and other facilities of communal, social-cultural and domestic function has been fulfilled.

The capital investments directed toward the social needs of the farm have significantly increased. It is enough to say that in the 11th Five-Year Plan they were 3 times higher per rural resident than the per capita figure for urban residents. In this period over 1.3 million square meters of housing have been built, or 10-15 apartments per farm. Fourteen new large public health facilities have become operational in the rayon centers and populated centers. Six rayon settlements and 47 central farmsteads of kolkhozes and sovkhozes have received gas line service for the first time, and the extent of asphalt covered roads has increased by 1,400 kilometers.

These and other measures are having a beneficial effect on the stabilization of the work force. Every year the number of farms which do not need to use the services of the urban population is increasing, even in peak periods of agricultural work.

The fulfillment of plans for the construction of housing and social-cultural-domestic facilities is being ensured due to the fact that the local Soviets of People's Deputies are performing significant work on cooperation of funds and concentration of capital investments for a single customer. In examining the title lists, every year the expediency of starting the construction of new facilities in the non-productive sphere is examined, and the list of the most important construction sites is determined, on which it is necessary to concentrate material-technical and human resources. Thus, in working out the plan outline for contract work by Glavprivolzhskstroy [Construction in the Pre-Volga Region Main Administration], the oblispolkom submitted proposals to the USSR Ministry of Construction, the USSR Gosplan [State Planning Commission] and the RSFSR Gosplan on excluding 62 facilities from the plan outline for 1984, whose construction could be put off until a later time. All this work played a significant role in formulating the plans of capital construction in the union ministries and the RSFSR Gosplan.

The solution of the economic and social problems facing the oblast's economic management is integrally tied with the further development of trade and public catering. In the 3 years of the current 5-year plan, the volume of retail goods turnover has increased by 15.3 percent, and the average annual growth provided by the decisions of the 26th CPSU Congress has been ensured. Such progressive forms of trade as trade fairs, exhibition sales, and trade by pre-placed orders have become more widespread.

A principally new direction in the development of the material-technical base for trade is the course toward construction of predominantly large, specialized stores, the mechanization of labor in the sector, and the transition of public catering enterprises to an industrial base.

In recent years the Soviets of People's Deputies have given much attention to domestic services rendered to the population. Provision has been made to



direct 31.2 million rubles in capital investments toward the development of this sector. Among these, around 50 percent comprise funds of industrial enterprises and local Soviets. There are plans to build and introduce into operation 380 domestic service facilities with a total area of over 120,000 square meters, or 3 times more than in the 10th Five-Year Plan, and to increase the volume of realization of domestic services by no less than 1.5 times, including a 1.6-time increase in services rendered in rural areas.

In these years, 16.7 million rubles in state capital investments have been directed and assimilated for the development of the material-technical base for domestic services. Sixty facilities have been introduced into operation, including three Domestic Services Houses with capacity of 1.7 to 2.3 million rubles in services per year. Every third domestic service facility is introduced due to funds from the oblast's industrial enterprises. Many of them have been established directly on the territory of the plants and factories.

According to the results of the All-Russian Socialist Competition for increasing the volumes of domestic services, improving the quality of order fulfillment, and increasing the level of service rendered to the population, and in recognition of the 60th anniversary of the formation of the USSR, Saratov Oblast was awarded the perpetual Red Banner of the RSFSR Council of Ministers and the VTsSPS [All-Union Central Council of Professional Unions].

Our results in the economic and social development of the oblast testify to the successful fulfillment of the historic decisions of the 26th Party Congress. According to the results of the All-Union Socialist Competition for 1983, Saratov Oblast has been named the winner and awarded the perpetual Red Banner of the CPSU Central Committee, USSR Council of Ministers, VTsSPS, and VLKSM [All-Union Leninist Communist Youth Union] Central Committee. This high award was also bestowed upon four rural rayons, seven kolkhozes and sovkhozes, construction and water management organizations. The cities of Saratov, Balakovo, Engels, the Saratov Rayon, 14 collectives in the agro-industrial complex, the Komintern Rural Soviet of the Engels rayon and the Perekopnovskiy Rural Soviet of the Yershovskiy rayon were awarded the perpetual Red Banners of the RSFSR Council of Ministers and the VTsSPS.

The first session of the USSR Supreme Soviet, 11th Convocation, placed crucial tasks before the Soviets of People's Deputies in the sphere of economic and cultural construction and improvement in the system of economic management. The Soviets must give particular attention to strengthening their executive and control activity, which must serve the cause of organization and development of the labor activity of the masses.

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CSO: 1820/167

## INTRODUCTION OF NEW TECHNOLOGY

### SOVIET ECONOMIST ON CAPITALIST, SOCIALIST VIEWS

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 6, Jun 84 pp 101-107

/Article by Yu. Ol'sevich, doctor of economic sciences, professor: "Criticism of Bourgeois Views of Socialist Planning of Scientific and Technical Progress"

/Text/ The scientific and technical revolution brings about a dynamism of economic processes--an accelerated replacement of equipment, technology and output, intensification of the shifts in the sectorial, occupational and territorial structure of employment and so forth. In the world of capitalism this leads to an aggravation of nonuniformity in development and to structural, cyclical and global crises. Under the conditions of socialism this sets the task of reorganization of the planned management of the national economy as an indispensable prerequisite for the realization of its advantages over capitalism.

Bourgeois ideologists try to take advantage of the present situation, in which the competition between the two systems occurs, in order to again drag out the thesis on the superiority of capitalism in the technical and economic sphere. This is especially necessary for them now, because the entire world has become convinced of the indisputable social advantages of the new system, which ensures full employment and a rise in the well-being of workers. With the noise about advances in the "computer revolution" apologists of imperialism would also like to deaden their universally known scandalous failure in the sphere of "protection of human rights."

History has already refuted the assertion that capitalism allegedly possesses a certain innate superiority over socialism in the field of scientific and technical progress. During a comparatively short historical period our country, technically dependent before the Great October Socialist Revolution, has reached the most advanced positions in the world in terms of various directions in scientific and technical progress. Nuclear power engineering, space rockets, laser technology, genetic engineering, metallurgical technology and electrical engineering--in these and many other fields the leading positions of Soviet science and technology are generally recognized. A unique nuclear reactor of a capacity of 1.5 million kW has been developed in the USSR during 1979-1983 alone. The powerful atomic ice breakers built in our country have added a new chapter to the history of the conquest of the Arctic regions. Mineral prospecting by means of superdeep wells has begun. Technical lasers have begun to be widely used in industry and medicine.

Soviet science and technology have made outstanding advances despite the obstacles created at first by the imperialist intervention and blockade and then by Hitler's aggression, which brought countless victims and havoc, and the "cold war" that followed. It is not accidental that every major achievement of science and technology in the USSR--be it the first atomic reactor, the launching of the first artificial earth satellite in the world, man's first space flight, achievements in laser technology and so forth--invariably causes shocks in the capitalist world and recurrent fits of anti-Soviet hysteria among the bosses of the military-industrial complex.

It is clear to any unprejudiced observer that the achievements on a world scale are based on the advantages of the social and economic system of real socialism, among which the planned management of scientific and technological development is one of the main ones. It is precisely this obvious conclusion that bourgeois "experts in socialism" now try to refute. They present ever newer arguments and concepts, beginning from statements on the "crisis in planning" up to the absurd concept of the "crisis of the system of socialism," against planned methods of management.<sup>1</sup> Their most common thesis is reduced to the fact that the planned management of science and technology has played the role of an accelerator in overcoming the initial lag of the USSR behind the West. However, under the present conditions of the "mature economy" and "computer revolution" centralized management has become a hindrance to scientific and technical progress.

First of all, it is necessary to take into consideration the acknowledgement by our ideological opponents that at previous stages without the planned management of scientific and technical progress its accelerated development in the USSR would have been impossible. It is not accidental that such acknowledgments are made, as a rule, indistinctly and in passing, because, essentially, they cancel out the initial methodological positions of the present critics of socialist planning.

Developing their versions of the scientific and technical competition between the two systems, bourgeois critics of socialism, on the one hand, falsely interpret the nature of scientific and technical progress in general and of the scientific and technical revolution in particular and, on the other, lean on the falsified interpretations of the content of socialist management, primarily planning.

The modern bourgeois economic theory torn by internal contradictions has neither a clear explanation of scientific and technical progress, nor a single approach to the planning problem. Keynesianism, which predominated before the early 1970's, assumed that the rate and directions of scientific and technical progress, like any market activity, could and should be regulated through the state budget and bank interest. The spontaneously formed potential of innovations is replenished and realized depending on the volume of "effective demand."

The right-wing bourgeois neoclassical direction (including the advocates of the "supply theory" and "monetarists"), which has gained strength from the second half of the 1970's, contrary to Keynesianism assumes that any centralized regulation, all the more so the planning of scientific and technical

progress, distorts its natural course, because in its nature scientific and technical progress is individual, unpredicted and unmanageable. Modern neo-liberals, who consider scientific and technical progress the object of "decentralized planning" and "free competition, the mechanism of "coordination of a great number of individual plans," are close in spirit (but not in form) to neoclassics.

The representatives of the institutional-sociological direction criticize Keynesianism from other, bourgeois-reformist, positions. They interpret scientific and technical progress as the manifestation of egoistic interests and psychological inclinations of the social groups connected with it, whose goals differ in many respects from the goals of society at large. The representatives of this direction demand the introduction of an indicative (recommended) planning of the economy in general and of scientific and technical progress in particular.

With all the differences among the directions of the bourgeois theory its general position is to represent scientific and technical progress as an "anti-plan" process spontaneous in its basis, whose content is determined either by the "creativity instinct," or by the interests of individual market agents or special organized social groups.<sup>2</sup> The method used by bourgeois political economy in this sphere is not new. It consists in imputing (ascribing) relations of private property fragmentation, market competition, anarchy and spontaneity inherent in the capitalist social and economic system to the productive forces of society themselves and in representing these relations as the natural properties of the productive forces themselves, primarily the properties of live creative labor.

However, the development and progress of productive forces are not some chaotic accumulation of chances, the manifestation of some "free will" of creative individuals, or of prestigious aspirations of "organized groups." This progress is subject to internal logic, which is based on objective laws of the structure of nature and thinking and on general historical laws of public production. Of course, the historically determined social system has an active and profound effect on the rates and directions of development of scientific and technical progress. In the interaction of productive forces and production relations, ultimately, the objective logic of the former has the determining role. This law discovered by K. Marx generalizes the historical experience of mankind.

However, if the development of science and technology occurs regularly, this means that these laws can be learned and utilized and that scientific and technical progress can be managed in a conscious and planned manner. Moreover, under conditions when the productive forces of society are formed primarily from gigantic machine systems interconnected not only within the boundaries of individual countries, but entire continents and even the world economy, the public planned management of scientific and technical progress has become an acute need.

There is a glaring contradiction between the theories of the bourgeois political economy on "unmanageable scientific and technical progress" and the realities of state-monopoly capitalism. Scientific and technical progress has



long been monopolized by gigantic corporations purposefully exploiting hundreds of thousands of scientific workers in their own laboratories or on the basis of contracts with specialized scientific organizations and universities. The state, which finances various scientific and technical programs and the training of scientific and technical personnel, actively helps corporations in this. State legislation, especially in the area of patents, capital investment incentives and so forth, has a powerful effect on scientific and technical progress.

The regulation of scientific and technical progress takes place on a state, as well as international, scale. It is carried out primarily by transnational corporations, for the majority of which patent monopoly is one of the main, if not the main, bases for expansion. Carefully protecting its scientific and technical superiority over competitors, American financial capital utilizes it as a lever of control over the activity of most transnational corporations, as a means of indirect management of scientific and technical progress throughout the capitalist world, of course, primarily in its own interest. Various interstate agreements also contribute to the regulation of scientific and technical progress.

The specific results of the state-monopoly regulation of scientific and technical progress can be seen from the accelerated development of global nuclear rocket systems and other forms of the arms race, which threatens mankind's existence, progressive destruction of the environment, accelerated ousting of millions of full forces of workers from production into a constant army of the unemployed and mass production of new articles, but useless and even harmful for health.

Some bourgeois economists are now forced to admit the groundlessness in pitting scientific and technical progress against planning. For example, the West German sovietologist U. Hower writes the following: "Despite all the shortcomings in the Soviet system of industrial scientific-research developments, the frequently encountered thesis that scientific and technical progress cannot be carried out under the conditions of a centralized system of planning and organization is unfounded. This thesis is wrong, because in the capitalist market economy the innovative process in industry has also not been spontaneous for a long time, but has represented an organized, planned process."<sup>3</sup>

However, despite Hower the regulation of scientific and technical progress on the part of state-monopoly capitalism qualitatively differs from its planning, because such a regulation is a form of effect on capitalist production anarchic in its basis. The object of this effect is not to eliminate spontaneity, but to give it a social direction and to accelerate or slow down individual processes. The spontaneity of development of scientific and technical progress under capitalism is manifested in the extremely nonuniform dissemination throughout countries and sectors and in the convulsive and critical nature of its movement. Power engineering can serve as an example. For a long time scientific and technical progress in this sphere in the United States and other capitalist countries developed spontaneously primarily under the effect of low oil prices by energy intensive ways and only the energy crisis, largely brought about by such development, produced a reverse reaction.

Under the conditions of the scientific and technical revolution and the arms race fanned by imperialism monopolies maximize their profit primarily through an accelerated introduction of innovations in the field of equipment, technology and new products and services. A significant part of these innovations represent a useless waste of resources, sometimes even dangerous for mankind. The dialectics of capitalist development leads to the fact that even a critical drop in the volume of production stirs up the development of science and technology even more, because it aggravates competition and forces entrepreneurs to feverishly search for qualitatively new spheres of application of capital instead of unprofitable spheres. Just as a slowdown in the growth of capitalist production does not signify a slowdown in scientific and technical progress, an acceleration of the latter does not at all indicate an acceleration of development or, especially, a revitalization of capitalism.

To the extent to which the groundlessness of the attempts by bourgeois economists to demonstrate the fundamental impossibility or unwillingness to plan scientific and technical progress is disclosed, in speeches by sovietologists emphasis is more and more shifted to a false interpretation of internal problems and contradictions in planning. The thesis of the inevitability of a gap between the planning of scientific research and experimental designing, on the one hand, and production plans, on the other, and within scientific research and experimental designing, between the planning of science and technical development plans is advanced.

The problem of overcoming a certain gap between scientific research and experimental designing and production exists in reality. The following was noted at the 26th CPSU Congress: "The introduction of scientific discoveries and inventions is now the crucial and most acute area. Scientific research and planning-designing should be more closely connected--economically and organizationally--with production."<sup>4</sup> However, bourgeois critics of socialism give a completely false interpretation of this problem. Prof R. Miller, an Australian sovietologist, considers the "gap between scientific discoveries and their introduction into production," which he attributes to the "cult of science" allegedly existing in the USSR and leading to the separation of science from production, the main and insurmountable obstacle to the acceleration of scientific and technical progress. Furthermore, in his opinion, the planned organization of scientific research orients it "toward traditional, normal research, not toward revolutionary breakthroughs. The deeply divided, hierarchic organization of research and development, apparently, corresponds to what Burns and Stalker called a 'mechanical model' in contrast to the little connected, horizontally mobile 'organic' model, which in its nature actively contributes to the advancement of scientific and technological innovations."<sup>5</sup>

Bourgeois critics of socialist planning speculate that under present conditions the Soviet Union faces tasks of an unprecedented complexity and scale. First, the planned process of transition to a qualitatively new, intensive type of socialist reproduction takes place, which in itself is equivalent in its depth to such a revolution as industrialization. Second, this transition is made under the conditions of development of a modern scientific and technical revolution on a world scale, which signifies not only an upheaval in science and technology themselves, but also a qualitative change in their

role in the development of production and society at large. Third, with the attainment by the USSR and other socialist countries of advanced positions in the scientific and technical competition with capitalism there is a sharp increase in the proportion of the autonomous generation of scientific and technical ideas, discoveries and inventions in these countries with respect to the utilization of foreign experience, especially the experience embodied in mastered foreign technology.

For these reasons a contradiction has arisen between the objectively new role of Soviet science and technology in reproduction and previously formed planning methods. All this sets the task of a serious reorganization of the planned management of the national economy, a reorganization that should be made "on the go," in the process of expanded socialist reproduction. The essence of such a reorganization is to see to it that planning masters all the links of scientific and technical progress--from the generation of fundamental scientific ideas through their realization in applied research and design developments up to the introduction of new equipment, technology and output in the entire national economy--as well as that the planning of scientific and technical progress is transformed into a permanent basis for the entire system of planned production management.

The planned management of scientific and technical progress makes it possible to ensure a long-term proportionality of the process of expanded reproduction as a whole. At the same time, the most efficient, optimum choice among comparatively labor-, capital-, energy- and material-saving technical variants makes it possible to attain the necessary proportionality between labor resources and fixed capital, between extractive and processing sectors and between consumption and accumulation for a long period. However, the capitalist method of regulation of scientific and technical progress, which is spontaneous in its basis, in principle, is unable to ensure such a proportionality, but, conversely, leads to a profound chronic, general crisis in employment signifying an unprecedented squandering of society's decisive resource--its human potential.

Bourgeois "experts in socialism" try to demonstrate that this type of reorganization in planning is impossible. Their efforts are now directed toward pitting the activity in the area of scientific and technical programs for general economic activity, the program-goal-oriented principle of planning, against the territorial-sectorial one. For example, the American professor I. Berliner writes the following: "Economic activity in contrast to program-goal-oriented developments is managed by social relations. Its goal is to obtain the maximum possible value results from the utilization of a limited set of resources."<sup>6</sup> The British sovietologist P. Amman, admitting that an "overall national program is capable of overcoming institutional barriers," states that this problem essentially is insoluble, because an increase in the number of programs would "seriously disrupt the entire economic structure." He concludes: "Even partial attempts have shown that these measures have soon brought back traditional difficulties."<sup>7</sup> In other words, according to Berliner and Amman, programs for scientific and technical progress can be successful only when they are a high-priority exception from the rules and not a form of acceleration of scientific and technical progress on the scale of the entire national economy.



Despite the programmed skepticism of bourgeois sovietologists the program method of planned management of scientific and technical progress on the scale of the entire national economy is not only possible, but is implemented in practice. An overall program for scientific and technical progress and its social and economic consequences for 1976-1990 has been worked out in the USSR.

In accordance with the methodological directives for the elaboration of state plans for economic and social development overall goal-oriented scientific and technical programs (as a rule, for a period of up to 10 years), which are to realize the most significant achievements in science and technology and to significantly raise the efficiency of production and the quality of output, and programs for the solution of key scientific and technical problems connected with the development of fundamentally new types of equipment and technology are also being worked out. These two types of programs form part of the general overall program for scientific and technical progress, although they differ qualitatively from it. The overall program for scientific and technical progress for 20 years as a whole in its nature is of a forecast, preplanned nature and, as Soviet specialists noted, the indicated types of scientific and technical programs "represent a directive, address planning document and envisage a set of measures coordinated in terms of resources, executors and periods of fulfillment of planned operations pertaining to various spheres of activity (scientific, planning-design, production and construction)."<sup>8</sup> They are determined at the stage of formation of the draft of the Basic Directions in the Economic and Social Development of the USSR, that is, before the preparation of the five-year plan with an annual breakdown.

Thereby, attempts by bourgeois sovietologists to pit scientific and technical programs against five-year and annual plans are groundless. These plans are drawn up on the basis of the basic directions and the indicated programs and realize them in the system of territorial-sectorial and foreign economic balance relations.

Planning is not a formal technocratic process consisting in the maximization of one or several indicators with an attitude toward all the other social and economic conditions as some "limitations."<sup>9</sup> It is to embody and to link together the logic of development of productive forces with the logic of improvement in production relations. At the same time, the process of optimization is of a multidimensional nature and encompasses all the basic economic aspects of various spheres of the life of society. Precisely because scientific and technical progress is moved by social and economic factors and directed toward the solution of social problems, its planning is inseparable from the structure, goals and needs of society.

Despite the bourgeois concepts of planning as some bureaucratic procedure called upon to "drive" economic processes into a formal uniform framework, the real planned mechanism of management of scientific and technical progress leans on the lively interests and moving forces of society, development of a standard base, organized unification of science with production, development of an appropriate incentive and price formation system and so forth.



Pitting plans and programs for scientific and technical progress against the mechanism of its stimulation by means of price regulation, incentive funds and so forth is one of the basic methods of the "sovietological" criticism of planning. For example, the American sovietologist Berliner put forward the absurd concept that, allegedly, before 1965 Soviet policy in the field of scientific and technical progress proceeded from its automatic suspension in capitalist countries and from the same automatic movement brought about by planned capital investments under the conditions of socialism. Since, this "expert" continues, the indicated aims proved to be incorrect, an orientation toward the price stimulation of innovations was adopted after 1965.<sup>10</sup> The purport of this concept is to pit the directive planning of scientific and technical progress as "noneconomic" against the mechanism of stimulation, which allegedly is similar to the western mechanism.

In reality the planning of scientific and technical progress in the USSR has always been based on the calculations of the national economic efficiency of technical variants. Innovations were evaluated from the point of view of their correspondence to the fundamental principles and interests of socialist society. This points to the scientific basis of the planned mechanism of management of scientific and technical progress. Innovations were realized in accordance with the main economic principle of distribution under socialism--wages--because the fulfillment of plans for new equipment is part of the basic duties of the members of labor collectives. Berliner pretends that he does not understand that various kinds of incentives at the expense of higher prices of new equipment and output represent only an additional stimulation, which is to accelerate scientific and technical progress as a whole and at its definite sections in particular.

The objective shift in the management of scientific and technical progress, with which Berliner speculates, is the change in the form of the planned reproduction of fixed capital and the shift of the center of gravity from new capital construction to modernization and reconstruction. However, despite Berliner neither the Marxist theory, nor practice have ever considered scientific and technical progress an automatic consequence of capital investments. Conversely, technological progress has always been considered the prerequisite for the investment process. V. I. Lenin wrote the following: "In essence, the very concept of 'additional (or successive) investments in labor and capital' presupposes a change in the methods of production and the transformation of equipment... An invariable state of equipment sets comparatively very narrow limits to additional investments of labor and capital."<sup>11</sup>

Of course, it would be a simplification to consider that the bourgeois theories of the "spontaneous" and "atomized" nature of scientific and technical progress in general are groundless. As a rule, the viability of these theories is due to the fact that they proceed from real phenomena, but absolutize these phenomena in a one-sided way and give them a false interpretation. However, reality consists in the fact that scientific and technical progress is made of two differently directed flows: Science and large specialized research and design organizations are the sources of one of them. The other flow is fed by the activity of millions of individual and group inventors and efficiency experts dispersed throughout the national economy.

The sophism of the bourgeois political economy lies in representing this dispersed activity as leading and, in principle, "unplanned." At the same time, they refer to the fact that up to 70 percent of the economic effect from scientific and technical progress is obtained from these small improvements. However, big efforts are not needed to understand that various kinds of mass improvements bring economic fruits only as a result of the introduction of new equipment and technology based on scientific achievements into production. New equipment does not always immediately disclose its full efficiency, but only after a number of "adaptive" reconstructions and additions made on the basis of the specific conditions of given production.

The basic importance of the "science-technology-production" flow has especially increased under the conditions of the scientific and technical revolution, which has transformed science into a direct and leading productive force, and the need for planned, centralized management of scientific and technical progress on the scale of the national economy has increased accordingly. To be sure, mass invention and rationalization creativity is a decentralized process proceeding from below, but is also included in the national economic planning process, forming one of the major components of the counterplans of labor collectives. Socialist planning has all the possibilities to provide this decentralized creative activity in the field of science and technology with the necessary financial and material resources, primarily through the creation of the appropriate reserves.

The planning of scientific and technical progress includes both the direct preparation of plans and programs for the development and introduction of new equipment, technology and output and the indirect effect on this process through indicators of the efficiency and quality of production. At the same time, for the solution of the problem of an organic coordination of the process of scientific discoveries (developments) and production the transformation of the purposeful set of weighed basic indicators of efficiency and quality into the main evaluation indicators of enterprise work is of key importance.

The management of scientific and technical progress should take into consideration that it is contradictory in its nature. Every innovation not only solves problems, but also in the majority of cases creates new ones. Ever newer demands on means of labor, materials, workers' skills, production organization and so forth are made. These kinds of chain reactions require close and flexible contacts among allied enterprises, that is, a sharp intensification of horizontal interdependencies in the national economy. Bourgeois critics of socialism count on pitting "vertical" relations against "horizontal" ones, identifying planning only with the first type of relations. Meanwhile, both theory and practice convince us that centralized planning is strengthened only when it becomes a form of regulation of the system of direct relations of cost accounting independent production associations and only on a planned basis can these relations develop without a crisis and rapidly.

Bourgeois economists cannot fully ignore the obvious fact that scientific and technical progress oriented toward the maximization of the capitalist profit is in conflict with public interests and becomes unstable from the point of view of its rates and directions. In their opinion, however, rejection of

profit as the main motive and criterion of development of scientific and technical progress is equivalent to a full loss of any social criteria in this sphere of activity and to the transformation of scientific and technical progress into some technocratic process.

For example, the British sovietologist R. Hutchings admits that the degree of profitability is not a reliable criterion during the determination of the directions of scientific research and experimental designing, because the connection between the expenditures on them and profit is of an unstable nature. He writes the following: "The Soviet system, as compared with the market economy, reacts to a much lesser extent to the profit motive and, therefore, can carry out projects embodying advanced scientific, technical and design solutions, which would not receive recognition in the market economy from the point of view of a commercial success."<sup>12</sup> The criterion of technical progressiveness ensures a "continuity within the framework of a specific direction of scientific and technical progress and lends a stable nature to scientific research and development."<sup>13</sup>

Next, however, contrary to common sense, Hutchings states that this, allegedly, leads to the fact that the "development of any technical direction is made for its own sake." "The Soviet Union still continues to be concerned with social problems to a much lesser extent than the United States, which enables Soviet researchers to work out more complex problems of technological development."<sup>14</sup> All this, in his opinion, is connected with the fact that the USSR is at the stage of an industrial society, which "is characterized by the striving for a quantitative growth and for an increase in technical efficiency," in contrast to postindustrial society, whose goal is the satisfaction of social needs and improvement in the quality of life.<sup>15</sup> Naturally, Hutchings does not explain to us how mass unemployment, destruction of the environment and the nuclear arms race on earth and in space contribute to an "improvement in the quality of life."

The famous French sovietologist E. Zaleski and the West German sovietologist P. Knirsch make similar loud complaints in connection with scientific and technical progress in the USSR, which "has lost its way" without the profit compass. The former writes the following: "The problem of the correlation of the results of science with broader economic goals is one of the greatest difficulties facing the planning of science in the USSR."<sup>16</sup> P. Knirsch is even more categorical: "The problem of how national economic needs (interests) can be taken into consideration during the introduction of technical innovations remains unsolved in Soviet economic theory and practice... The importance of this problem is known to Soviet theoreticians and planners. However, the way to overcome these difficulties inherent in the system can hardly be proposed."<sup>17</sup>

Meanwhile, in the practice of socialist planning there are methods of calculations of the national economic efficiency of investments in science and technology and of a comparative evaluation of different variants of scientific and technical progress. The fact that scientific and technical progress is included in the general framework of planned development consciously subject both to the general criteria of scientific socialism and to the specific system of social goals for the plan period is the most important.



Ultimately, the entire socialist system of planning of scientific and technical progress, as well as the planning of the rates and proportions of socialist reproduction, on the whole, is subject to the realization of social programs. Such a direction of scientific and technical progress forms the basis for the fact that year after year the people's well-being in the USSR rises and working conditions are gradually improved and facilitated.

Characterizing the 5-year period following the elections to the USSR Supreme Soviet of the 10th convocation, in particular, K. U. Chernenko, general secretary of the CPSU Central Committee, said the following: "On the whole, this was a productive period. The country's productive forces became stronger and were renewed significantly. More than 1,000 industrial enterprises equipped with modern machinery were put into operation. Existing plants and factories were reconstructed and modernized in a significant volume... The fuel and power base of the national economy was developed."<sup>18</sup>

The confident and progressive development of the socialist economy and the reorganization of its material and technical base, the economic mechanism and planning methods carried out in the course of this development point to the groundlessness of bourgeois attempts to doubt the central task of developed socialism--to organically link the achievements of the scientific and technical revolution with the advantages of socialism.

#### FOOTNOTES

1. See: "La Crise Economique Dans les Pays Socialistes," PROBLEMES ECONOMIQUES, Paris, 1982, No 1755.
2. "Centralized planning of innovations," J. Ropke, the famous West German economist, writes, "is as impossible as squaring the circle. Innovations need freedom, that is, the absence of coercion. However, centralized planning is based on the use of the coercion apparatus. In contrast to the market system a centrally managed system is characterized by a high degree of hostility to innovations. At a certain stage of its development it becomes hostile to evolution. This hostility to innovations and evolution is so obvious that it needs no additional comments" (J. Ropke, "Osthandel und Entspannungspolitik, FRANKFURTER ALLGEMEINE, 1976, 28 February, S 11).
3. U. Hoyer, "Zentrale Planung und technischer Fortschritt. Probleme seiner Organisation und Durchsetzung am Beispiel der sowjetischen Industrie," Berlin, Duncker/Humblot, 1977, S. 206, 207.
4. "Materialy XXVI s"yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, Politizdat, 1981, p 43.
5. See: "Modernisierungsprobleme in der Sowjetunion," Berlin, 1982, S. 15.
6. I. Berliner, "The Innovation Decision in Soviet Industry," London, 1978, p 507.



7. "Wirtschaftsprobleme Osteuropas in der Analyse," Berlin, 1982, S. 42, 44.
8. "Kompleksnaya programma nauchno-tekhnicheskogo progressa v regione" [Overall Program for Scientific and Technical Progress in the Region], edited by I. Sigov, Leningrad, Nauka, 1983, p 30.
9. The French economist J. Ellul wrote the following: "... Any planning of the national economy is at first and mainly technology, which, in principle, is applicable to any type of activity and to any economic system and which always connects two main elements--the goal or combination of the advanced goals and the sum of the means for attaining them. At the same time, the main task is to attain a correspondence of the indicated goals and means" (P. Salles, "Problemes economiques generaux," Vol 2, Paris, 1974, p 252).
10. See: I. Berliner, "Technological Progress and the Evolution of Soviet Pricing Policy," in "Economic Welfare and the Economics of Soviet Socialism," Massachusetts, Cambridge University Press, 1981, pp 106, 108 and 109.
11. V. I. Lenin, "Poln. sobr. soch." [Complete Works], Vol 5, p 101.
12. R. Hutchings, "Soviet Science, Technology and Design," New York, 1974, p 247.
13. R. Hutchings, in "Soviet Economic Prospects for the 70th," Washington, 1977, p 82.
14. Op. cit., p 84.
15. Op. cit., p 86.
16. SURVEY, 1977-1978, No 2, p 36.
17. P. Knirsch, "Strukturen und Formen zentraler Wirtschaftsplanung," Berlin, Duncker/Humblot, 1969, S. 235.
18. K. U. Chernenko, "Narod i partiya yediny" [The People and the Party Are One], Moscow, Politizdat, 1984, p 5.

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